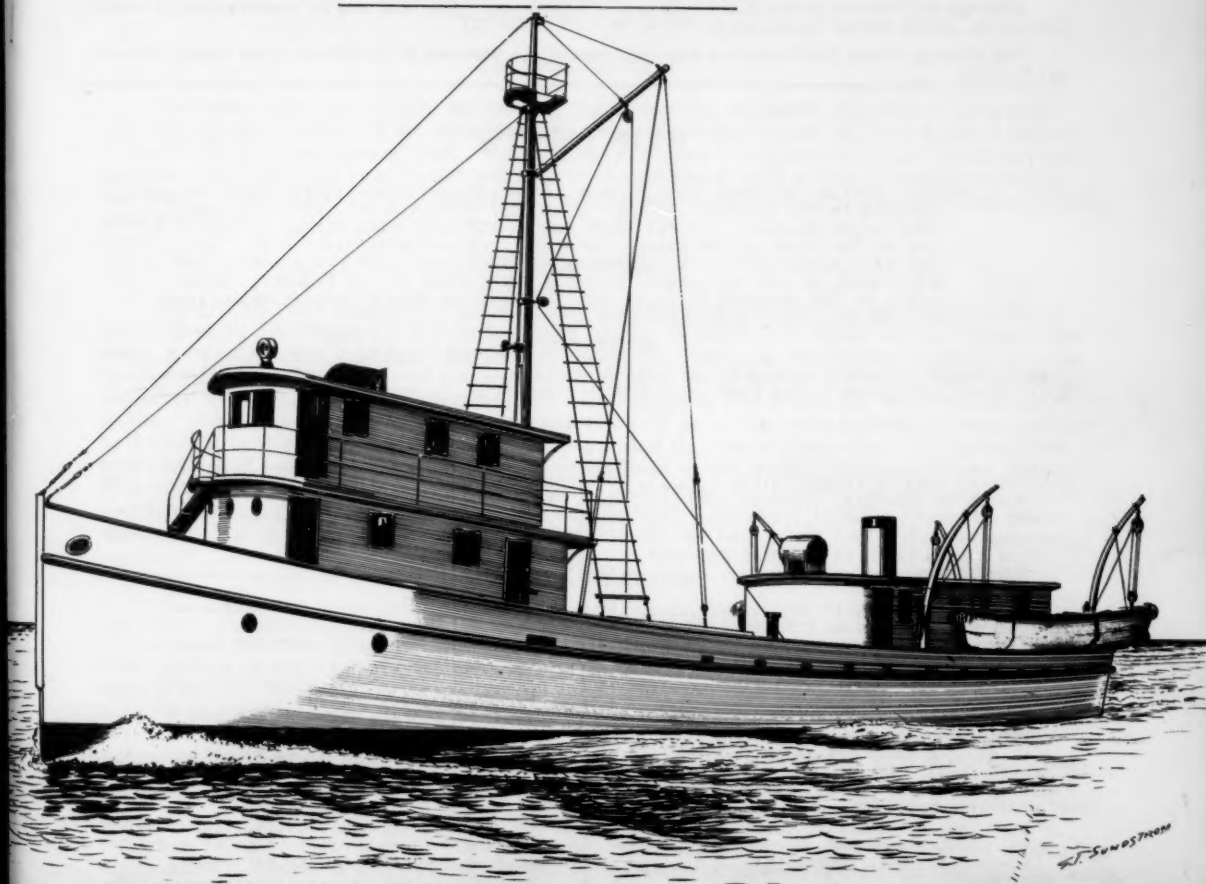


# COMMERCIAL FISHERIES REVIEW

MENHADEN PURSE SEINER



Vol. 16, No. 1

JANUARY 1954

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Washington, D.C.



## COMMERCIAL FISHERIES REVIEW



A review of developments and news of the fishery industries  
prepared in the BRANCH OF COMMERCIAL FISHERIES

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## FISHING VESSEL LIVE-BAIT EQUIPMENT

By Carl B. Carlson\*

### INTRODUCTION

The pole-and-line fishery for tuna is dependent on adequate supplies of live bait, and the potential range of the tuna fishing vessel depends in part on the vessel's ability to carry large quantities of bait. The equipment used to capture bait and to preserve it alive varies from the simple net and row boat combined with a tank of noncirculating sea water used in the Cuban fishery to the very elaborate system on United States Pacific tuna clippers.

### CUBAN FISHERY

The method and equipment for catching and holding live bait in the Cuban fishery (described by Rawlings 1953) consists of a short, shallow fine-mesh net set from a row boat, a receiver for transporting the bait from the shoals to the fishing vessel, scoops for transferring the bait, and live wells. The live wells are fitted with plugs for draining after the bait has been expended, but no provisions are made for the circulation of water. Since the fishing grounds are near the bait grounds, this system is practical for bait caught in the morning and generally expended the same afternoon. However, the availability of bait varies and a circulation system would permit holding larger quantities of bait for an increased period of time. The principle species of bait is the majua (*Jenkinsia lamprotaenia*). Experiments conducted by Springer (1953), utilizing tanks with circulating seawater, revealed that majua can be kept alive for prolonged periods.

### HAWAIIAN FISHERY

More elaborate equipment (described by June 1951) is used in the Hawaiian fishery for capturing and holding bait alive. The bait is quite small and is caught in fine-mesh nets, either at night by using lights to attract the bait to surround nets or lift nets, or during the day by using large encircling nets. The net boats are powered by outboard motors and the transfer of bait to the vessel is made with buckets to avoid injury to the bait through loss of scales. Live-bait wells are built in the hull and are fitted with screened holes below the water line to permit the entrance and exit of sea water. Bait may be kept alive for from one to several weeks in wells of this nature. By plugging the holes and draining the water into the bilge, the wells may be converted to carry tuna. When under way or rolling in a sea, the circulation is adequate to keep the bait alive, but when lying in calm waters the fishermen must periodically rock the boat to encourage circulation. There is a trend toward the installation of power-driven circulation systems. Both the Hawaiian and the Cuban tuna fisheries were pioneered by Japanese immigrants, and the influence of their homeland methods predominates.

### PACIFIC ALBACORE FISHERY

The system of capturing and holding bait alive in the United States Pacific albacore fishery was derived from the tuna clippers, but it is less elaborate and the vessels are

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NOTE: THIS PAPER WAS READ AND DISCUSSED, ALONG WITH OTHERS AT THE INTERNATIONAL FISHING BOAT CONGRESS (1953) AT PARIS, FRANCE (OCTOBER 12-16, 1953); AND MIAMI, FLORIDA (NOVEMBER 16-20, 1953). ALL PAPERS AND DISCUSSIONS WILL SHORTLY BE PUBLISHED BY ARTHUR J. HEIGHWAY PUBLICATIONS LTD., 68 VICTORIA ST., LONDON, S.W. 1, ENGLAND.

smaller. Most of the live-bait vessels in this fishery were designed for participation in other fisheries, but they have adequate stability to carry live-bait tanks on deck. Circulating water is supplied by pumps and the bait is caught in large lampara nets set either from a powered boat or from the fishing vessel.

### TUNA CLIPPERS

The most elaborate system in the world for capturing and holding bait alive is found on United States Pacific tuna clippers. Essentially, when building a tuna clipper the owner is trading a large sum of money for the maximum amount of refrigerated cargo space, bait and fuel capacity, and other necessary items in a minimum length of vessel. Since the cost of the hull is predicted on the length, all space must be fully utilized for dual purposes where possible.

The equipment required for live bait on a tuna clipper consists of tanks to provide a space for a large quantity of bait to live, a water-circulation system to supply the necessities to sustain life, boats and gear to catch the bait, and facilities for transferring the bait from the nets to the tanks.

**BAIT TANK DESIGN:** The structure of the tanks must be adequate for the weight of water plus safety factors for service at sea. Hatches at least 18 inches high are required to maintain a head of water to eliminate air pockets and to prevent sloshing. Waterproof lights of at least 100 watts should be installed in the accessible sides of the tanks to permit the bait to mill properly at night. Portable or fixed lights over the hatches are also desirable. Smooth-surface screens with adequate openings to reduce the flow rate to limits which will not injure the bait are essential.

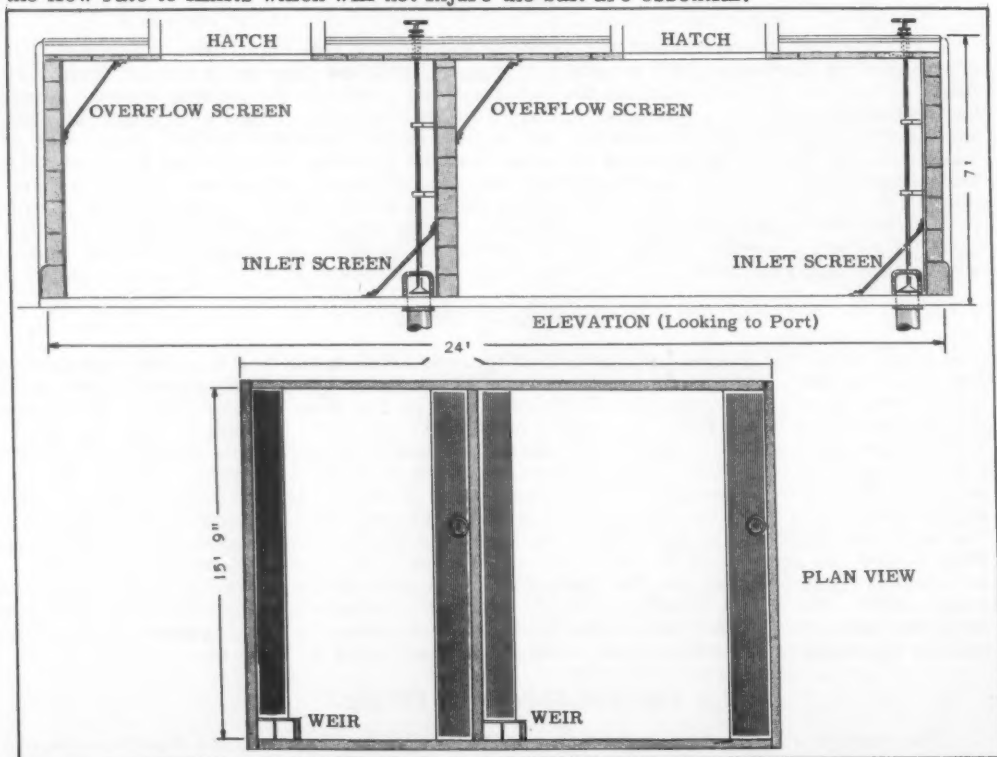


FIGURE 1 - TUNA CLIPPER BAIT TANK (UNEQUAL SCALES, DIMENSIONS APPROXIMATE).



Considerable controversy exists among fishermen as to the amount of live bait which can be carried in a tank of a given volume. The amount of bait is probably dependent on a number of factors, including oxygen content, temperature, and salinity of the water; degree of abuse to which the bait is exposed between capture and deposit in the tanks; variation in the hardness of the bait because of species, area or season of capture; and the proper design and manipulation of the tanks and circulation system. General practice is to place somewhat more bait in the tanks than is expected to survive and to remove the weaker individuals which die in the "rest period."

When the U. S. Fish and Wildlife Service vessel Oregon, now based at Pascagoula, was operated in the commercial tuna fishery off Central America in the Pacific Ocean, 300 and 400 scoops of bait (each containing about 12 pounds) were placed in deck tanks having a capacity of 4,100 and 6,130 gallons, respectively, exclusive of baffle and screen areas. When doing investigational work in the Japanese tuna fishery, Cleaver and Shimada (1950) reported that a sardine  $2\frac{3}{4}$  inches long required 0.07 cubic feet of water in tanks having natural circulation; i.e., screened holes in the hull to admit sea water. The amount of water per fish, under forced circulation, could be reduced to 0.05 cubic feet with a water temperature of 64° F. to 68° F. In another instance, approximately 1,000 pounds of bait were held in a tank 8 x 8 x 7 feet without mechanical circulation. The same authors also report 50 buckets, containing from 15 to 20 pounds of bait per bucket, in a tank 6-3/4 x 6-3/4 x 9-5/6 feet without mechanical circulation.

The design of the screens in the bait tanks aboard a clipper is very important. They must have a relatively smooth surface and openings small enough to restrain the bait. But the open area must be adequate to admit and discharge the water at flow rates that will not injure the bait. Too rapid flow on the inlet side will affect the milling of the bait, while an excessive flow rate through the discharge side will draw the live bait or cause dead bait to collect and clog the screen. Typical screens are made of  $\frac{3}{4}$ -inch waterproof marine plywood with 1/8-inch slots cut by a circular saw on 1-inch centers. Very little, if any, reliable published data is available on the optimum area of the openings, and fishermen may provide additional slots if the bait behaves improperly. One tank having a volume of 910 cubic feet was fitted with inlet and outlet screens having areas of 338 and 494 square inches respectively.

The deck bait tanks are of a general rectangular form to suit the available space, but the below deck tanks (or wells) are vertical on 3 sides while the fourth side and bottom conform to the shape of the hull. Water for the deck tanks is introduced at one corner behind the screen and allowed to overflow through a screen and baffle in an opposite or adjacent corner tending to create circulation in a horizontal plane. Water for the below deck tanks is admitted at the bottom on the shaft alley side and allowed to overflow in the upper outboard side tending to create circulation in a vertical plane. The flow of water to the tanks is throttled by a valve. On the deck tanks the overflow is governed by the height of baffle boards which are set to maintain a constant level of water in the hatch. The rate of discharge and the consequent level of water in the hatch in the below deck wells is controlled by a through-deck valve behind the discharge screen.

**PUMPS AND PIPING:** The pumps for supplying sea water to the tanks are of the vertical-impeller type designed to deliver large volumes at low head pressures. High head-pressure types are undesirable because of the possibility of churning and separating dissolved gases from the water. The sea chests for the pumps are located near the keel and close to amidship to permit the suction of water that is the least disturbed by the vessel when cruising. It is considered best practice to have pumps with a performance capacity capable of delivering enough water to change the contents of the tanks 5 to 7 times per hour. To achieve this performance, a safety factor of at least 2 should be considered for the water can be throttled by the tank supply line valves. The importance of live bait to the clipper dictates the installation of dual pumps either of which can carry the load for most of the tanks. The pumps discharge to a header on each side with a crossover connection to permit using one or both pumps for the entire system. Each takeoff to a tank is fitted with a valve for governing the flow or for isolation of the tank.

**BAIT FISHING BOATS AND GEAR:** Most of the bait is taken in sheltered areas along the coasts of Mexico and Central America. Consequently, small boats are suitable and

desirable for the bait is frequently found in water too shallow or too dangerous for the clipper to enter. In this connection it should be mentioned that if the bait-pump intakes are too close to the bottom, mud may be drawn into the tanks causing undue mortality of the bait. Three boats are used to find and capture bait: a power speedboat capable of speeds up to 30 or more miles per hour, a net skiff, and a "dry boat." The powerboat may be fitted with an automatic depth sounder to aid in locating the bait. Powerboats vary from 16 to 18 feet in length, 4 to 5 feet in beam, and are powered with a high-speed gasoline engine from 100 to 150 horsepower. Some are fitted with reduction

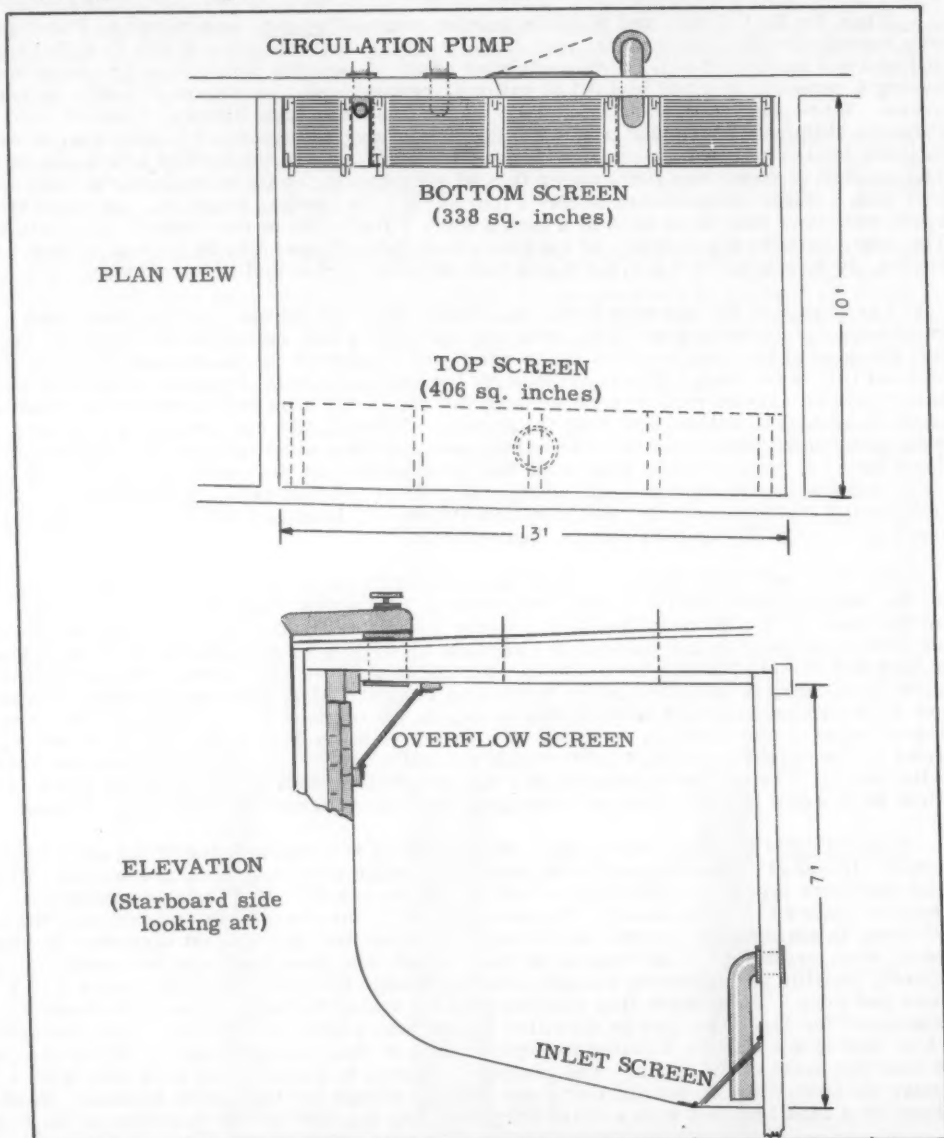


FIGURE 2 - TUNA CLIPPER BAIT AND BRINE WELL (UNEQUAL SCALES, DIMENSIONS APPROXIMATE).

gears permitting the use of larger diameter propellers to reduce slippage when towing the net and dry boat. The net boats are from 16 to 18 feet in length, from 6 to 7 feet in beam, and from 20 to 30 inches in depth. The dry boats are flat-bottom skiffs about 12 feet in length and are used to hold the end of the net while setting and to support the fish bag. Two men are required in the speedboat--one serves as an operator while the other searches for bait and directs the fishing operation. From 6 to 8 men are required to set and haul the net. When not in use the boats are carried in nests aboard the clipper.

Most of the bait is caught in hand-operated lampara nets varying from 130 to 160 fathoms in length and from 50 to 75 feet in depth at the bag. The end meshes in the

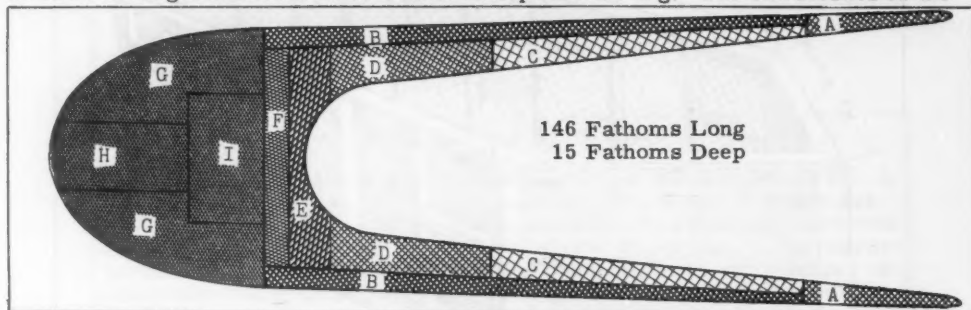


FIGURE 3 - LAMPARA BAIT SEINE.

**WINGS**

- A - ONE FATHOM LONG, 15 MESHES DEEP, 5" MESH, 27-THREAD TWINE.
- B - FIFTY-SEVEN FATHOMS LONG, 25 MESHES DEEP, 3-3/8" MESH, 9-THREAD TWINE.
- C - FOR 44-1/2 FATHOMS, 144 MESHES DEEP, 8" MESH, 9-THREAD TWINE.
- D - FOR 15-1/2 FATHOMS, 205 MESHES DEEP, 6" MESH, 6-THREAD TWINE.

**APRON**

- E - 175 MESHES LONG, 747 MESHES DEEP, 3-3/8" MESH, 9-THREAD TWINE.
- F - 133 MESHES LONG, 900 MESHES DEEP, 2" MESH, 6-THREAD TWINE.

**SACK**

- G - 610 MESHES LONG, 600 MESHES DEEP, 1/2" MESH, 20/6 THREAD.
- H - 610 MESHES LONG; 300 MESHES DEEP, 1/2" MESH, 20/6 THREAD.
- I - 300 MESHES LONG, 900 MESHES WIDE, 1/2" MESH, 20/6 THREAD.

CORKLINE - 9-THREAD MANILLA

LEADLINE - 6-THREAD MANILLA

950 THREE-INCH CORKS

77 LBS. 1-1/2-OUNCE LEADS

wings vary from 5 to 8 inches (stretched measure) and gradually diminish in size to 1/2-inch (stretched measure) mesh in the bag. The lampara nets are lightly floated and leaded in the wings, about one cork and one lead every 12 to 18 inches; but they are heavily buoyed and leaded in the bags, about 3 corks alternating with a 6-inch space, and the bottom line is almost solidly leaded at the throat. This type of net (described in general in *Pacific Fisherman*, December 1942) is used along the mainland for day fishing in shallow water or at night in deep water when the bait can be located by phosphorescence.

A smaller fine-mesh net from 125 to 150 feet in length and 20 to 30 feet in depth is used for capturing bait in the clear waters near the rocky shores of the Galapagos Islands. The nets are moderately buoyed and weighted, with about 2 corks and leads per foot, and a mesh size of from 3/4 to 1 inch by stretched measure, depending on the preference of the fishermen. These are used as a surround net and extend from the surface to the bottom. Because of obstructions it is necessary to send divers to the bottom to free the net and to keep the lead line together while hauling. The diving equipment may be either a helmet or a face mask supplied by compressed air from the surface or a face mask and an air tank. Because of the need for bending over while clearing the net and the possible loss of air from a helmet, the trend is toward face masks.

If the bait is caught in areas too shallow or too hazardous for the clipper to approach, it is transferred to a collapsible receiver which can be towed. The receiver consists of a box stern and midships section (about 10 feet long, 7 1/2 feet wide, and 3 feet deep) and a pointed bow section (about 6 feet long). The bow section is solidly planked on the leading sides to open the water while towing, but the aftersection is covered on the sides and bottom with netting to provide circulation.

The schools of bait may be located either from the clipper or from the speedboat by surface signs during the day or by phosphorescence at night. In making the set, the dry boat is released holding one end of the net, and the circle is completed by the speedboat towing the net skiff. Dumping the bag is a critical operation for considerable differential exists between the length of the float and lead lines. The bag must be specially

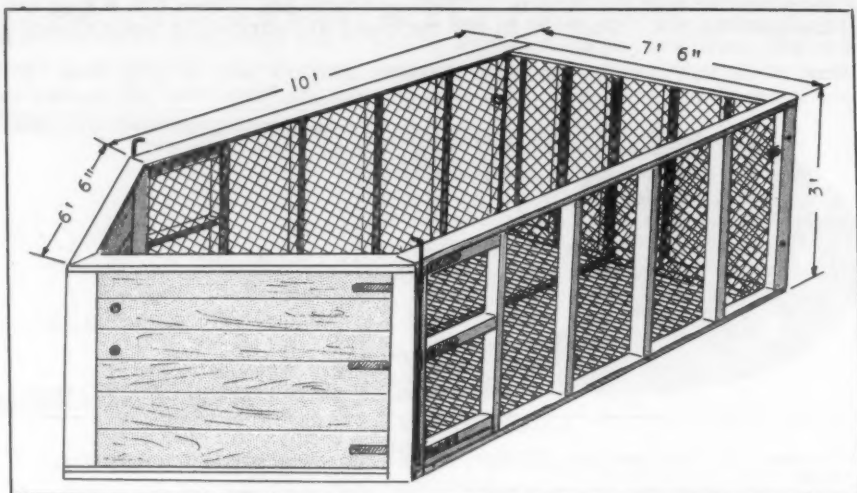


FIGURE 4 - FLOATING BAIT RECEIVER (DIMENSIONS APPROXIMATE).

piled so that it can be set as a unit to avoid tearing. If the length of the circle exceeds the length of the net, a running line is paid out so that both ends may be pulled to the net skiff. The lampara is retrieved by hauling from both ends. Until the lead line is aboard, one man throws a weighted line into the opening to scare the fish into and keep them in the bag. Meanwhile, the dry boat has picked up the cork line at the bag for additional support. After "drying up," the fish may be transferred directly to the clipper if the water is deep enough. Otherwise the bait is transferred to a receiver and towed to the clipper. Transferring is done with scoop nets of  $\frac{1}{2}$ -inch mesh holding from 10 to 15 pounds of bait. After making bait the clipper generally remains from one to several days in quiet water to acclimate the fish to life in the tanks (a "rest period").

A new method of using pumps to transfer the live bait is described in Pacific Fisherman July 1953.

Recently a new-type trap lift net for catching tuna bait fishes has been developed by the technical staff of the U. S. Fish and Wildlife Service exploratory fishing vessel Oregon (Siebenaler 1953). This net is operated from the fishing vessel, using lights to attract the schools of bait at night. To date, it has been extremely successful in catching anchovies and other small bait species in the Gulf of Mexico. It eliminates the need for special bait boats and large bait seines, and appears promising for use by the commercial tuna fleet. It differs from ordinary lift nets in that it has the advantage of quick lift of the sides independent of lift of the bottom and frame of the net.

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### HOW TO COOK OYSTERS

The U. S. Fish and Wildlife Service's Test Kitchen Series No. 3, How to Cook Oysters, contains 38 recipes kitchen tested by the Service's home economists. Fish wholesalers and retailers of oysters will find this illustrated booklet a valuable sales aid as well as an eye-opener to the number of different methods for preparing oysters. Recipes and other material in this booklet may be reproduced freely and without restriction.

There are three important species of oysters in this country. The Eastern oyster found and cultivated from Massachusetts to Texas, inclusive, comprises about 89 percent of the domestic oyster production. The small Olympia oyster is found on the Pacific Coast from Washington to Mexico and is cultivated in Puget Sound near Olympia. The large Pacific or Japanese oyster, introduced from Japan in 1902, is also cultivated on the Pacific Coast. The West Coast contributes close to 10 million pounds of oyster meats or about 11 percent of the total catch.



With the growing recognition of the importance of a balanced diet to safeguard health, oysters are now included in meals because of their nutritive value as well as for their flavor. Oysters are an excellent source of the "protective" nutrients--proteins, minerals, and vitamins. An average serving of six oysters will supply more than the daily allowance of iron and copper, about one-half the iodine and about one-tenth of the needed protein, calcium, magnesium, phosphorous, Vitamin A, thiamine, riboflavin, and niacin. Few foods are better balanced nutritionally than oysters. Only additional sources of calories are needed to make a completely rounded meal from a nutritional standpoint.

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## SALT CONTENT OF SALMON CANNED FROM BRINE-FROZEN FISH

By D. T. Miyauchi\* and M. Heerdt, Jr.\*

### ABSTRACT

REPORTS ON HOW THE AMOUNT OF SALT CARRIED BY BRINE-FROZEN SALMON TO THE CANNED PRODUCT IS AFFECTED BY METHODS OF STORING AND OF THAWING. STUDIES INDICATE: THAT (1) THE AMOUNT RETAINED BY BRINE-FROZEN RED SALMON HELD IN DRY STORAGE AND THEN THAWED IN RUNNING WATER, STILL WATER, OR STILL AIR IS NOT EXCESSIVE AND (2) THE AMOUNT RETAINED BY BRINE-FROZEN CHUM SALMON HELD FOR TWO WEEKS IN REFRIGERATED BRINE AT 50° F. AND THEN THAWED IN RUNNING WATER IS LESS THAN 0.5 PERCENT. THIS SALT RETAINED FROM BRINE FREEZING CAN BE COMPENSATED FOR BY ADDING TO EACH CAN ONLY 50 TO 80 PERCENT AS MUCH SALT AS IS USED WITH CANNED FRESH SALMON.

### INTRODUCTION

This report is presented in answer to inquiries made to the Seattle Fishery Technological Laboratory on the amount of salt carried to the canned product as a result of using brine-frozen salmon. Studies were made to determine how the amount of salt is affected by (1) the method of storing the brine-frozen salmon and (2) the method of thawing them.

USE OF BRINE-FROZEN SALMON IN CANNING: Until recent years nearly all the salmon taken in Alaskan waters for canning were processed in Alaska from fresh fish. However, by 1951, freezerships became established in the Alaskan salmon industry as a result of economic developments and a change in fishing regulations to allow the use of power vessels in the Bristol Bay fisheries. In that year, nine freezerships took salmon from Bristol Bay for subsequent canning in the Puget Sound area. In 1952 the freezerships operating in Bristol Bay doubled in number to 18. In both years a few freezerships also operated in the districts of Central Alaska and Southeastern Alaska.

The freezerships are equipped with wells in which the salmon are frozen by immersion in brine. The frozen salmon are then transferred to dry refrigerated storage. Sometimes, however, it is convenient to hold some of the frozen salmon in the refrigerated brine until the ship arrives at the cannery. Varying opinions have been expressed as to the extent of salt penetration into the salmon stored in such a manner. Studies made at the Fishery Technological Laboratory at Boston on brine freezing cod and had-dock at sea (Pottinger, Holston, and McCormack 1952) have shown that salt continues to penetrate the meat of the fish if, after being frozen, the fish are allowed to remain in the brine, especially at temperatures above 10° F.

Several days before the freezership arrives at the cannery, the refrigeration is turned off to facilitate the separation of salmon that may have frozen together. The final thawing is completed at the cannery, where any of a number of different methods may be used. At some canneries the salmon are loosely stacked 2 to 3 feet high on the floor or in bins and are then sprayed with fresh water either continuously from overhead nozzles or intermittently from a hose. At other canneries the fish are placed in large tanks or fish bins and covered with running fresh water. With any of these procedures, thawing usually requires 12 to 24 hours.

After the brine-frozen salmon have been thawed, they are canned in the same manner as are fresh salmon, except that less salt is added.

### EFFECT OF THAWING METHOD

An experimental pack of canned brine-frozen salmon was prepared to determine what effect the method of thawing has on the salt content of the canned product.

PREPARATION OF CANNED SAMPLES: For this experiment, Bristol Bay red salmon (*Oncorhynchus nerka*) were obtained from a freezership. These salmon had

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been frozen by immersion for approximately 12 hours in brine cooled to about 5° F. and had then been held in dry storage, also at 5° F., until unloaded at Seattle.

After the salmon had been taken to the laboratory, they were divided into three groups and thawed as follows:

1. In running water. The salmon were placed in a barrel in which tap water was run in at the bottom at the rate of 4 gallons per minute and allowed to overflow at the top; thawing time, 4 hours.
2. In still water. The salmon were placed in a barrel and covered with tap water; thawing time, 12 hours.
3. In still air. The salmon were placed in a large wooden fish box; thawing time, 14 hours.

After being thawed, the salmon were butchered, cleaned, cut into slices of proper thickness, and packed into half-pound cans, all by hand.

Instead of 1/8-ounce (0.125 ounces) of salt being added to each can, as with fresh salmon, the amount was varied according to the method of thawing used. Four 10-grain salt tablets (0.091 ounces) were added to each can of the salmon thawed in running water, and 3 tablets (0.068 ounces) were added to each can of the salmon thawed either in still water or in still air. After the salt was added, the cans were vacuum sealed, retorted for 90 minutes at 240° F., and cooled in air at room temperature.

SALTINESS OF THE VARIOUS CANNED LOTS OF SALMON THAWED BY DIFFERENT METHODS: The saltiness of the canned salmon was judged after the cans had been in storage for several months. Samples from each lot were compared organoleptically with those canned commercially from unfrozen fish. No difference in saltiness could be detected among the various lots. In addition to the organoleptic tests, the salt content was determined chemically on the entire contents of several cans from each lot by the methods of analysis of the Association of Official Agricultural Chemists (1950). The results given in table 1 show that the salt content of the samples from the various lots of brine-frozen salmon packed experimentally were within 0.1 percent of that from the unfrozen salmon packed commercially.

Table 1--Effect of the Method Used to Thaw Brine-frozen Bristol Bay Red Salmon on the Salt Content of the Canned Product

Method of Thawing	Amount of Salt Added Per $\frac{1}{2}$ -pound Can		Can Number	Salt Content	
	In grains	In ounces		Individual Values Percent	Weighted Average Percent
In running water .....	40	0.091	1	1.8	1.6
			2	1.6	
			3	1.6	
			*	1.6	
In still water .....	30	0.069	1	1.6	1.6
			2	1.2	
			3	2.2	
			*	1.6	
In still air .....	30	0.069	1	2.0	1.7
			2	1.6	
			3	1.6	
			*	1.6	
Control samples commercially packed from unfrozen fish .....	-	0.125	1	1.6	1.6
			2	1.4	
			3	1.6	
			4	1.6	
			5	1.6	
			6	1.5	

\* COMPOSITE SAMPLE OF 6 CANS.

**CONCLUSIONS:** The data indicate that the amount of salt retained by red salmon brine frozen at about 5° F. and then thawed in running water, still water, or still air is not excessive. This salt retained from brine freezing can be compensated for by adding 50 to 80 percent as much salt as is used with canned fresh salmon.

#### EFFECT OF STORING FROZEN SALMON IN REFRIGERATED BRINE

An opportunity to determine the salt content of the canned product from frozen salmon held in brine came during the autumn of 1952 when a freezership brought a load of brine-frozen chum salmon (*Oncorhynchus keta*) from Southeastern Alaska to a Puget Sound cannery. Part of the brine-frozen salmon (called group A) had been held in dry storage. The rest (called group B) had been stored in brine at 5° F. for approximately 2 weeks.

The following four lots of samples were obtained:

Lot 1: Salmon from group A packed commercially in 4-pound cans.

Lot 2: Salmon from group B packed commercially in 1-pound cans.

Lot 3: Salmon from group B taken to the laboratory, thawed in running water, and packed in  $\frac{1}{2}$ -pound cans with three 10-grain salt tablets (0.069 ounces).

Lot 4: Salmon from group B taken to the laboratory, thawed in running water, and packed in  $\frac{1}{2}$ -pound cans with no added salt.

Samples from each of these four lots were analyzed to determine their salt content. The results are given in table 2.

Lot No.	Type of Storage Used for Brine-frozen Salmon Prior to Packing	Type of Pack	Size of Can	Amount of Salt Added to Each Can		Can No.	Salt Content		
				Pounds	In grains		In ounces	Individual Values	Weighted Average
								Percent	Percent
1	Dry .....	Commercial	4	?	?	1	1.6	1.3	
						2	1.1		
						3	1.2		
						*	1.3		
2	Brine at 5° F. .	Commercial	1	?	?	1	1.1	1.1	
						2	1.0		
						3	1.0		
						**	1.1		
3	Brine at 5° F. .	Experimental	$\frac{1}{2}$	30	0.069	1	1.2	1.1	
						2	1.1		
						3	1.0		
						**	1.1		
4	Brine at 5° F. .	Experimental	$\frac{1}{2}$	0	0	**	0.47	0.47	
*COMPOSITE SAMPLE OF 3 CANS.									
**COMPOSITE SAMPLE OF 6 CANS.									

**CONCLUSIONS:** The data indicate that brine-frozen chum salmon held for approximately 2 weeks in brine at 5° F. and then thawed in running water carry less than 0.5 percent salt to the canned product. The data further indicate that this retained salt can be compensated for by decreasing the amount added during the canning process.

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### Progress on Projects, December 1953

FREEZING FISH AT SEA--NEW ENGLAND: Specifications are being drawn up covering repairs to the Service's research trawler Delaware recently damaged by fire.  
(Boston)

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DEVELOPMENT OF A DRIED PRODUCT FROM CONDENSED MENHADEN SOLUBLES OR STICKWATER: Samples of dried menhaden solubles were prepared by a commercial concern using a solvent-extraction method. The product will be compared with the laboratory drum-dried samples of the same lots to determine whether or not the process has a beneficial effect on hygroscopicity and on storage characteristics. Comparison will also be made of the nutritive value by animal-feeding tests and by analyses for the various vitamins.

(College Park)

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COMPOSITION OF FISH: The proximate composition of one sample of the white muscle tissue from octopus tentacles was determined. The results are as follows:

Moisture - 84.0 percent	Oil - 0.8 percent
Protein - 14.0 percent	Ash - 1.9 percent

(Ketchikan)



### COD-LIVER OIL AND PRODUCTION COSTS

Nutrition studies at the U. S. Fish and Wildlife Service Experimental Hatchery, Cortland, New York, have included studies on the desirability of providing cod-liver oil in the diet of trout. The Service has recently summarized the relation of cod-liver oil to production costs.

The inclusion of cod-liver oil at the established level of 3 percent of the diet has increased the rate of growth from 20 to 30 percent. The cost of the oil at this level is approximately 1 cent per pound of food. Assuming a total cost of 7 cents per pound for the standard diet and a conversion factor of 3 (pounds of food to produce 1 pound of fish), it would cost 21 cents to produce a pound of fish. If a 20-percent increase may be expected from the use of oil, the same amount of food will produce fish at a conversion rate of 2.5 pounds per pound of fish. The cost of this diet would be 8 cents, giving a total cost of production (food) of 20 cents per pound. Aside from this saving, it would take only four-fifths as long to rear the fish to a given size and result in a great decrease in labor and handling costs.

The total cost, of course, would depend upon the hatchery, its location, and efficiency of management.

-- The Progressive Fish-Culturist, April 1953



# TRENDS AND DEVELOPMENTS

## Alaska

**PINK SALMON CATCH IN SOUTHEASTERN AREA, 1953 SEASON:** The 1953-season catch of pink salmon in Southeastern Alaska was 77 percent less fish than in 1951 (the previous pink salmon year); while the catch in Northern British Columbia was down 72 percent from the same period (see table). The decline in the two areas is at about the same ratio, the Service's Branch of Fishery Biology reported recently. Inclusion of the catches for central and southern British Columbia would be misleading, since neither area is adjacent to Alaska, and thus might be expected to have different changes in abundance.

Pink Salmon Catch for Southeastern Alaska and Northern British Columbia		
	1953	1951
	No. of Fish	No. of Fish
Southeastern Alaska . . . . .	5,145,020	22,211,020
Northern British Columbia	1,400,000	4,900,000

The disastrous 1953 pink salmon season in Southeastern Alaska and Northern British Columbia following the successful fresh-water history of the 1951 brood emphasizes the need for some means of predicting marine survival.

In only two of the twelve years of records from the Service's Little Port Walter Station were there any significant increases in the number of returning adults. Through use of the number of fry divided by the number of eggs as an index of fresh-water survival, and the number of returning adults divided by the number of fry as a measure of marine survival, the following values were obtained for the two very successful years:



PINK SALMON

Brood Year	Percentage of Fresh-water Survival	Percentage of Marine Survival
1940/42	6.4	2.7
1947/49	2.0	11.1
12-year average	2.5	2.6

For 1940/42, fresh-water survival was responsible for the success of the year class, while in 1947/49 the marine survival was responsible. At the same time the other survival values were near normal.

In the 1951/53 brood the fresh-water survival value was 9.3 percent--the highest found in 12 years of records. Catastrophic events in the sea allowed a marine survival of only 0.3 percent which wiped out any previous gain and resulted in the very poor catch in the Southeastern Alaska pink salmon fishery during the 1953 season.



## California

**NEW FISHERIES REGULATIONS:** Many changes were made in the California regulations on commercial fisheries in the 1953 session of the State Legislature, reports the October 1953 Outdoor California, a publication issued by that State's Department of Fish and Game.

A number of changes pertaining to use of fish nets included: outlawing use of gill, trammel, and fyke nets in the Sacramento-San Joaquin Delta area; permitting drift and



set gill nets, and drift and set trammel nets in Districts 17, 18, 19, and 20A, and drift trammel nets in District 10.

Other changes prescribed permissible shrimp or prawn nets; set aside coastal waters within three nautical miles of shore as bottomfish nursery grounds; defined legal and illegal trawl nets; and permitted use of beach nets in District 10 providing the meshes are at least  $1\frac{1}{2}$  inches in length.

The Legislature set a 2,500-pound yellowtail tuna and 5,000-pound white tuna possession limit, except those taken south of waters off the Mexican border; prohibited sale of all catfish except those imported or artificially reared; and outlawed sale or purchase of surf perch south of Point Arguello. No kelp, rock, sand, or spotted bass, except imported, may be sold or purchased and none of these species may be taken under  $10\frac{1}{2}$  inches in length.

Black abalone may be taken for bait in certain sections of District 19. Razor clams may not be taken from Little River Beach in Humboldt County between the mouth of the Mad River and Moonstone Beach; after December 31st (1953) and in succeeding even-numbered calendar years, none may be taken from Little River Beach between the mouth of the Mad River and the mouth of Strawberry Creek; and in each succeeding odd-numbered year thereafter no razor clams may be taken between the mouth of Strawberry Creek and Moonstone Beach.

All natural beds of native oysters on State tidelands and in bays, lagoons, and estuaries together with other State tidelands set aside by the Department of Fish and Game are declared oyster reserves and may not be allotted to persons or companies. Seeds may be removed from them for replanting on permits from the Department providing the person or company agrees to return one-half the amount he removes within a one-year period.

Persons engaged for profit in the capture, transport, or sale of live fresh-water fish for bait need a permit from the Department.

Anchovies may be taken for bait or human consumption in any coastal waters lying south of Pt. Mugu, but fishermen must fish outside the three-mile limit for anchovies for commercial processing.

All charter sportfishing boats of any size whose owners accompany the boat must take out a \$3 permit, starting April 1, 1954. Additionally, all vessels operating in public waters in connection with fishing operations for profit must take out a \$10 certificate of boat registration starting April 1, 1954. Boats rented without operators, except in-board boats, are excepted.

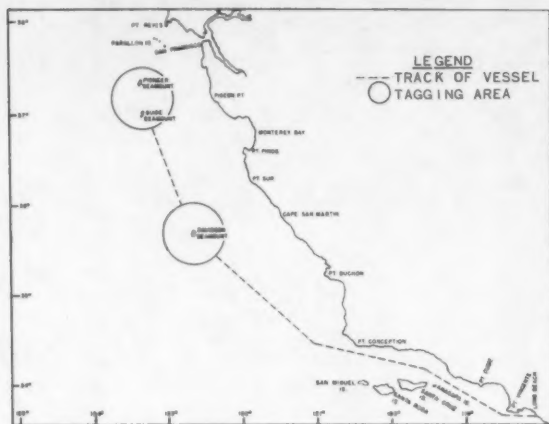
Under a commercial license, fishermen may take king salmon by hook and line between May 1 and September 30 in Districts 6, 7, 10, 11, 15, 16, 17, and 18; and silver salmon may be taken by hook and line between July 1 and September 30. Legal minimum length for king salmon is 26 inches from snout to tip of tail, that for silver salmon, 22 inches. This section will remain in effect until Oregon and Washington enact laws or regulations prohibiting the taking of silver salmon by commercial trolling prior to July 1 of any year.

Salmon may not be taken commercially at the mouth of Humboldt Bay in those parts of Districts 6 and 7 within three nautical miles north and south of a line due west from the center of the mouth of the bay.

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ALBACORE TUNA TAGGING CONTINUED BY "N. B. SCOFIELD" (Cruise 53-S-6): A total of 362 small albacore tuna was tagged off the coast of Central California by the State Department of Fish and Game research vessel N. B. Scofield on an 18-day cruise completed at Los Angeles on October 23, 1953. The objective was to tag the smaller fish near the end of the fishing season, and approximately two-thirds of the tagged fish

were under 700 mm. ( $27\frac{1}{2}$  inches) in fork length. This was the time when the fish are more scattered and the fishery had progressed to its more northern limits. Experimental type "F" and "G" tags were used.



ALBACORE TAGGING CRUISE OF THE N. B. SCOFIELD (53-S-6)

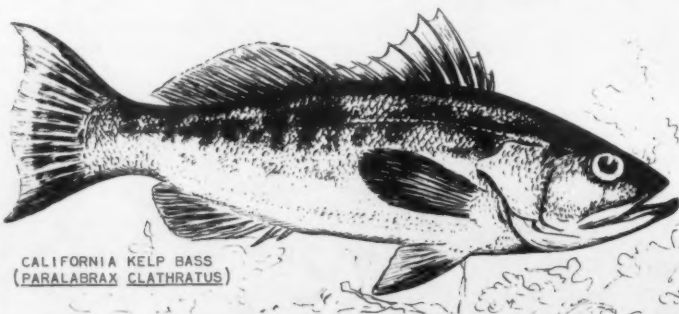
and seventh dorsal finlets and above the lateral line. It is hoped that some of these fish will be returned at a later date so that it can be seen what actually happens to the scales as they grow older.

Examinations of the gonads of the smaller fish indicated that they were in an immature stage of development.

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**KELP BASS TAGGED BY "N. B. SCOFIELD" (Cruise 53-S-7):** A total of 332 kelp bass were tagged and released at Santa Catalina Island off the coast of California by the N. B. Scofield on an 8-day cruise ended November 5, 1953. Large kelp bass were sought in order to obtain growth information, but over half were between 11 and  $12\frac{1}{4}$  inches in length; only 14 exceeded  $14\frac{1}{2}$  inches in length. Other objectives of the cruise were to: (1) obtain information on the size composition of the bass at selected fishing locations; (2) supplement length-weight data already on hand; (3) obtain spotfin and yellowfin croakers, corbina, and barred perch for tagging, food, and maturity studies; (4) obtain specimens of other fishes for aquaria and taxonomic study.

Fishing was poor at Santa Rosa, Santa Cruz, San Nicolas, and Santa Barbara Islands which were visited in the order named. Specimens of several species of sea perch were taken by beach seining at Santa Rosa Island (Bechers Bay). Bass fishing at San Clemente Island (Mosquito Harbor and White Rock) was very productive, over 300 bass being taken in a day and a half. Two very successful aqua-lung dives were made at Mosquito Harbor. Bass, perch, and black-smith were very abundant near the vessel and the dives revealed the fish to



be from several feet below the surface nearly to the bottom. No kelp bass was present near the diver in the first dive, but some were present in close proximity on the second dive.

Large specimens of bass (over 16 inches) were to be seen, although there were more to be found in the near cover. All sizes of bass, from large to fish probably not over two or three months old were occupying the same relative area. Very small bass could almost be touched with the fingers and seemed to prefer the bottom.

Wire traps and trammel nets were successful in taking several species. Traps were placed in the area where successful hook-and-line fishing occurred. However, despite strategic placing of traps by diving and the use of anchovy bait, only 6 small bass entered. This is the first detailed information obtained on trap efficiency in comparison with live-bait fishing in an area known to be heavily populated with bass.

Light stations produced squid in abundance, and a few species of fish.



### Cans--Shipments for Fishery Products, January-September 1953



Total shipments of metal cans for fish and sea food during January-September 1953 amounted to 83,258 short tons of steel (based on the amount of steel consumed in the manufacture of cans). Comparative data for 1952 are not available.

NOTE: STATISTICS COVER ALL COMMERCIAL AND CAPTIVE PLANTS KNOWN TO BE PRODUCING METAL CANS. REPORTED IN BASE BOXES OF STEEL CONSUMED IN THE MANUFACTURE OF CANS, THE DATA FOR FISHERY PRODUCTS ARE CONVERTED TO TONS OF STEEL BY USING THE FACTOR: 23.0 BASE BOXES OF STEEL EQUAL ONE SHORT TON OF STEEL.



### Federal Purchases of Fishery Products

**FRESH AND FROZEN FISHERY PRODUCTS PURCHASED BY DEPARTMENT OF THE ARMY, OCTOBER 1953:** The Army Quartermaster Corps in October 1953 purchased 2,236,975 pounds (valued at \$1,120,493) of fresh and frozen fishery products for

Purchases of Fresh and Frozen Fishery Products by Department of the Army (October and the First 10 Months of 1953 and 1952)							
QUANTITY				VALUE			
October		January-October		October		January-October	
1953	1952	1953	1952	1953	1952	1953	1952
Lbs.	Lbs.	Lbs.	Lbs.	\$	\$	\$	\$
2,236,975	3,009,618	23,643,186	29,113,339	1,120,493	1,500,691	10,415,224	13,315,720

the military feeding of the U. S. Army, Navy, Marine Corps, and Air Force (see table). This was a decrease of 2.4 percent in quantity, but an increase of 9.3 percent in value as compared with September purchases, and less by 25.7 percent in quantity and 25.3 percent in value than a year ago.

Army Quartermaster Corps purchases of fresh and frozen fish during the first 10 months in 1953 totaled 23,643,186 pounds (valued at \$10,415,224), a decrease of 18.8 percent in quantity and 21.8 percent in value as compared with the similar period a year earlier.

The over-all average price paid by the Army Quartermaster Corps was the highest since March 1953, due mainly to seasonal price increases. The average price in October was 50.1 cents per pound, compared with 44.7 cents in September and 49.9 cents in October 1952.

In addition to the purchases of fresh and frozen fishery products indicated above, the Armed Forces generally make some local purchases which are not included in the above figures. Therefore, actual purchases are somewhat higher than indicated, but it is not possible to obtain data on the local purchases made by military installations throughout the country.



### Gulf and Caribbean Fisheries Institute

**SIXTH ANNUAL SESSION:** The Sixth Annual Session of the Gulf and Caribbean Fisheries Institute convened at Miami Beach, Fla., November 16-20, 1953. The meeting was held simultaneously with the International Fishing Vessel Congress of the Food and Agriculture Organization of the United Nations, Shrimp Association of the Americas (Quarterly Meeting), Southeastern Fisheries Association (Quarterly Meeting), and the Atlantic States Marine Fisheries Commission (Southern Section Meeting).

After the opening session, there was a joint session with the International Fishing Vessel Congress, an Industry Session, an Economic Session, a Biological Session, and a Technical Session.

These were the papers presented at the Industry Session:

1. "Handling Shrimp in the Breeding Plant," by J. Roy Duggan. Presents a number of rules to be followed in order for a breeding plant to produce high quality breaded shrimp.
2. "Handling Shrimp in the Canning Plant," by H. R. Robinson. A step-by-step discussion of the methods and practices employed in shrimp canning.
3. "The Organization of a Quality Control Program in a Fish Plant," by William F. Hampton. Discusses the steps that must be taken in setting up a quality-control program in order to keep a product out front in the race for the consumer's dollar, and also to reduce errors and waste on the production line.
4. "Handling Shrimp Aboard Fishing Vessels and at the Dock," by Pedro Pinson. Describes method of handling shrimp aboard Mexican Pacific coast shrimp trawlers (55-65 feet) operating from Mazatlan, Mexico, from October 1 until early July of the following year. Trips extend 50 to 600 miles from port and last 10 to 12 days. Points out that an experiment will be attempted at Mazatlan in the near future--trained French divers using "Aqua Lungs" will attempt to observe and record photographically the action of the shrimp trawl in catching shrimp.

At the Economic Session these papers were presented:

1. "Financing of Fishing Vessels by Commercial Banks," by Charles T. Taylor. Points out the standards that banks adhere to in making loans. Describes the experience of a number of bankers located in states bordering on the Gulf in making loans to finance the purchase of fishing vessels.
2. "Financing of Vessels in the Gulf States," by Jno. J. Faubion. Indicates that banking in industry finally is "discovering" the commercial fishing industry to the benefit of all concerned. Urges fishing industry to maintain

accurate records of production, earnings, cost of operation, etc.

3. "Financing of Fishing Vessels by Financial Institutions," by R. S. Murphy. Reports on experience in financing income-producing vessels, methods of financing, and financing of the allied equipment in the industry.

These were the papers presented at the Biological Session:

1. "Changing Concepts in Fishery Research in the Great Lakes," by Ralph Hile. Points out that the principal accomplishment of fishery biology in the Great Lakes has been to teach us that for more effective understanding we must focus attention on the ecology of whole populations of fish made up of complexes of species. Of primary consequence are the interactions between species, both commercial and non-commercial, and the manner and extent to which they are affected by changing environment and by fishing activities.
2. "Fifty Years of Fishery Biology in Europe," by Michael Graham. Discusses effect of hydrography on fisheries, rational fishing, study of fluctuations, and studies of plankton. Trends noted are traced by reference to selected discoveries in each field.
3. "Fisheries Dynamics and the Concept of Maximum Equilibrium Catch," by Milner B. Schaefer. Reports on attempts to estimate equilibrium catch and maximum equilibrium catch by combination of estimates of the elemental rates of recruitment, growth, and mortality. Discusses an alternative approach to specify the form of the relationship between population size and natural rate of increase, and to determine the parameters from existing numerical data of the fishery. A method of estimation is outlined, together with the application of the Verhulst-Pearl logistic. Data for the Pacific sardine and halibut fisheries are employed in examples.
4. "Fifty Years of Progress in Solving Fishery Problems," by William C. Herrington. Indicates that there is evidence that the analyti-



cal approach to the study of fish-stock productivity has proven more productive than the synthetic approach. Principal characteristics and some accomplishments of five international fishery conventions are reviewed.

Technical Session papers follow:

1. "Evaluation of Five-Pound Packages of Glazed and Unglazed Shrimp," by Marian Klein, L. E. Simerl, and Ernest Adams. Reports on experiments to determine whether unglazed raw shrimp could be held satisfactorily for long-term storage at 0° F. when protection was provided by a heavy waxed carton with a suitable protective overwrap. Results indicated that unglazed shrimp in packages with an overwrap showed negligible weight loss and were in excellent condition; therefore, the glazing operation is not necessary if the carton has a protective overwrap.
2. "Comparison of Objective Tests for Quality of Fresh and Frozen Gulf Shrimp," by E. A. Fieger and J. J. Friloux. A report on chemical, bacteriological, and organoleptic studies made daily on samples taken from stored fresh headless shrimp, and monthly for 12 months on samples of these same shrimp which had been frozen after 24 hours, 6 days, and 12 days of ice storage. It is postulated that loss of quality during the early period of ice storage is caused mainly by autolysis. With longer storage spoilage occurs mainly through bacterial action. From the results it is evident that changes induced by bacteria or catalyzed by enzymes are proceeding too slowly at 0° F. (-18.8° C.) to be used to measure modification in quality.
3. "Freezing Gulf of Mexico Shrimp at Sea," by John A. Dassow. Points out advantages of brine freezing shrimp aboard the vessel: brine freezers are adaptable to small boats; brine freezing of small units such as shrimp is fast and efficient; brine freezing provides
- some protection against dehydration. There is no evidence that brine freezing shrimp, then thawing and refreezing produces changes in color, flavor, or texture which do not also occur in air-freezing of shrimp.
4. "Some Physical and Chemical Changes Taking Place in Iced Shrimp," by Charles E. Lane and Edward B. Whittaker. Four hundred shrimp removed at random from a much larger sample stored in Rickey-type crushed ice for periods ranging from one day to 25 days. Reports on analyses of these shrimp for changes in content of moisture, protein, indole, tyrosine, tryptophane, and for gross changes in fluorescence. The most promising approach, from the standpoint of practical utility, appears to be that of the ultra-violet induced fluorescence. Deterioration in quality can generally be detected by this method 24 to 36 hours before it becomes evident to the experienced taste panel. Results and practical implications of the other tests are discussed, along with some of the intrinsic sources of variation in such analyses.
5. "Further Experiments in Holding of Fresh Shrimp in Refrigerated Seawater and Ice," by J. B. Higman, C. P. Idyll, and James Thompson. Discusses refrigerated seawater experiments and icing experiments in order to determine some method of preventing the formation of "black spot." Aureomycin hydrochloride in concentrations of 5 p.p.m. was found to be effective in elimination of undesirable odors that develop as a result of holding shrimp in sea water in order to curb "black spot" formation. Also, tests have shown that shrimp dipped immediately after heading and a second time 7-8 days later in a 2½-percent concentration of sodium bisulfite developed only traces or small amounts of "black spot" after as much as 17 days.



## Gulf Exploratory Fishery Program

**LIVE-BAIT TUNA FISHING TESTED IN GULF BY "OREGON"** (Cruise 20): Poor results were obtained in live-bait tuna fishing outside the continental shelf of the northeast Gulf of Mexico by the Service's exploratory fishing vessel "Oregon" in the summer and fall of 1953. The cruise commenced in July, but was interrupted on a number of occasions for various reasons and was completed on November 1. Fewer tuna were sighted than during the late summers of 1950, 1951, and 1952, but enough schools were found to allow a good trial of live-bait fishing.

Sufficient quantities of live anchovies for bait were taken at night with a trap lift net near islands off the Louisiana, Mississippi, and Alabama coasts. The behavior of the bait was satisfactory. Losses were 5 percent to 20 percent during the first 24 hours, but after this initial loss the bait appeared to be hardy. A few small blackfin tuna were taken from each of several schools and one series of five small bluefin tuna were taken, but none of the schools could be held at the stern of the vessel long enough for satisfactory catches. The majority of the schools appeared to be made up of tuna of mixed sizes and of more than one species. Occasionally gear was lost to large tuna appearing suddenly among small fish.



**Fish Finders Tested:** Observations with an electronic fish finder ("Fischlupe") indicated the presence of scattered large fish in midwater outside the continental shelf at depths varying from 40 to 150 fathoms. The indicated distribution was irregular with some apparently rich and some barren areas.

Another experimental and modified electronic fish finder was also used on the Oregon for one week in order to ascertain whether it would be possible to distinguish shrimp from small bottom fish on the instrument. It was possible to predict the volume of trawl catches with reasonable accuracy from indications on the instrument, but indications of shrimp and small bottom fish were not perceptibly different. During most of the time the instrument was in use, the bottom water temperatures in the areas worked were warmer than surface water temperatures and the grooved shrimp were scattered. The instrument did locate concentrations of fish which proved to be mostly spot and croaker, and drags of commercially significant quantities were found in 15 to 20 fathoms south southeast of Cape San Blas, Florida.



### Joint Fisheries Promotion Program Launched by Three Countries

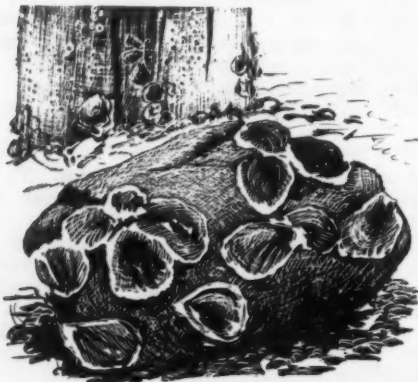
United States, Canadian, and Norwegian fishery interests have launched a joint fisheries promotion program, reports the National Fisheries Institute. The newly-formed N. F. I. Public Relations Committee, composed of members of United States, Canadian, and Norwegian firms, met on December 2 with an advertising agency in New York City. The advertising agency made a presentation of the program which is being executed on fishery products for this newly-formed group.

The launching of this promotion program is a result of the decision of the National Fisheries Institute's Board of Directors made at their last annual convention in Washington, D. C., to invite firms from Canada, Iceland, and Norway to join the Institute in its fisheries promotion program.



### Maryland

**CHESAPEAKE OYSTER INVESTIGATIONS:** Oyster shell bag exposures were discontinued for the 1953 season by the State of Maryland's Chesapeake Biological Laboratory, except at local stations where observations on year-round fouling of shells are being made, reports a recent release from the Maryland Department of Research and Education. Recovery of some of the last test shells exposed has been irregular and those at a number of stations were unrecovered. Setting ended in September 1953 at most locations. Two spat found on 20 shell faces from Cinder Hill exposed during the period October 11-27 were the last observed set of the season.



OYSTER SPAT (MAGNIFIED MANY TIMES) ON SMALL PEBBLE.

The primary purpose of test-shell exposure is to determine the time and relative intensity of oyster setting at a given location. The time and degree of fouling of shell surfaces by other organisms also can be observed. The relationship between the number of spat attaching to clean test shells and the amount of commercial set on old cultch or on commercial shell plantings is highly variable and appears to be largely dependent upon the extent of fouling of the commercial cultch or shell. Fouling on test shells exposed for only a one-week period seldom is sufficient to affect the number of

spat attaching during the exposure period. With weekly changes of test shells during a very intensive set, the total number of spat for the season (obtained by adding together the sets for each week) could be so great that a single batch of shells exposed during the whole season would not have enough surface to receive all of the spat. Hence it usually happens that the count of spat on commercial shells is a smaller fraction of the number found on test shells when sets are heavy than when sets are light.

During 1953 the set of oysters on test shells as well as on natural cultch was considerably lower than is usually found. Many complex and interacting factors are believed to affect the successful spawning and setting of oysters. Present knowledge of these is quite incomplete and no explanation of the season's below-normal set can be made. The amount of set in Maryland has varied widely from year to year in the past and may be expected to continue to do so in the future. Certain of the data obtained from test shells and from other longer period exposure of experimental shells, however, are useful in indicating how the greatest advantage can be taken of the sets which do occur.

The greatest initial set on commercially-planted shell can be had by timing the planting so that clean shell surfaces are presented during the period of maximum setting intensity. Practical considerations usually make it difficult, if not impossible, to attain this ideal. No method for accurately predicting the exact time of maximum set in Maryland areas has yet been worked out. Records of setting on test shells in a given area over a period of years, however, makes it possible to determine the normal time when peak setting can be expected, and the degree of variation which may occur from this normal. The time of setting may vary from place to place and may be of brief or long duration with single or multiple peaks. Counts of spat were made on 40 shell faces (inner surface only) exposed at two locations in each of the areas shown. Areas of shells were measured and a figure calculated to represent the number of spat which attached per day to a single uniform shell face of 50 square centimeters or about the area of a typical four-inch oyster shell.

It has been observed that a definite succession of attachment of fouling organisms occurs at certain seasons and that the presence of one type of fouling may affect the kind and rate of attachment of other fouling organisms. Barnacles have a heavy wave of setting in late spring and another during the fall and early winter under most Maryland conditions. Barnacles are further known to interfere seriously with oyster setting when alive and present in quantity. It also has been observed that barnacles set in much greater numbers on newly planted shell than on shell which has been overboard long enough to acquire a coating of organic film (distoms, algae, bacteria, etc.). Since the heavy barnacle set usually occurs about two months before the peak of oyster setting, delay of shell planting until after the barnacle set should result in better sets of oysters than if the shells were planted in early May.

The huge quantities of shells planted annually by the State presents a formidable problem in physical handling alone. Effective use of equipment and manpower from the standpoint of economy can be had by planting over as long a period as possible. Inability to store shells economically in certain areas also may require their planting as they accumulate if they are to be used at all for cultch. Similar problems are faced in lesser degree by private planters. Obviously under present conditions it is not possible to make all shell plantings during June or early July. If planting is done during other months, then it is desirable to know what loss of shell efficiency as cultch may occur and whether or not such loss among early spring planted shell might not be offset to some extent by the lesser quantity of barnacles they would pick up in May.

In order to gather information on comparative efficiency of shells planted in different months of the year, the Chesapeake Biological Laboratory made plantings on numbered shallow trays placed overboard at two locations in the St. Marys River and one in Holland Straits. Such plantings were made from October 1952 to June 1953. These trays were taken up in November 1953 and spat counts were made. Since 1953 proved to be a poor setting year the counts are not considered as representative as would be true in normal years. Also the barnacle set was heavy at only one of the locations so that interference by this organism was not as great as usually occurs. The results

have proved interesting even though they must be considered preliminary in nature and not necessarily typical of what may occur in other years or in other locations. Since counts are rather irregular, the general trend can best be shown by averaging together the trays at all three locations. It should be pointed out that the upturn in spat count on June shells was due mostly to the results at the one station where barnacle setting during May had been highest. Similar experiments in past years for the late spring months only also have shown a decreased efficiency of May planted shells and a marked upturn in counts on those planted in late June.

The above information was abstracted from Oyster Bulletin No. 10. Copies of the bulletin are available from the Chesapeake Biological Laboratory, Department of Research and Education, State of Maryland, Solomons Island, Maryland.



### North Carolina's New Shellfish Regulation

A regulation, apparently to aid the enforcement of a tax on certain shellfish, was published as a legal notice in North Carolina recently, reports the Service's Fishery Marketing Specialist in that State. The new law, scheduled to go into effect on January 1, 1954, states:

"Regulations No. 5--(173) Section IX: It shall be unlawful for any person or persons, firm or corporation to ship or offer to ship oysters, clams, shrimp, escallops or crabs without a bill of consignment and tax receipts from the shipper written or stamped in ink or indelible pencil, showing the date of shipment, quantity of each product shipped, and to whom consigned. It shall be unlawful for any express company, railroad company, or any other common carrier to accept for shipment, or to transport on the public highways any shrimp, escallops, clams, oysters or crabs without the bill of consignment and tax receipts from the shipper showing the tax has been paid."



### Pacific Oceanic Fishery Investigations

YELLOWFIN TUNA ABUNDANCE OFF CHRISTMAS ISLAND INVESTIGATED BY "JOHN R. MANNING" (Cruise 17): A 23-day cruise to the equatorial tuna grounds was completed on November 8 by the Pacific Oceanic Fishery Investigations' research vessel John R. Manning. At the same time the vessel successfully established a temporary scientific field station at Christmas Island about 1,000 miles south of Hawaii. Experimental long-line fishing to test the abundance of yellowfin tuna in the immediate vicinity of that atoll was carried out by the vessel.

The tuna catch was good during the 6 days of experimental fishing around the island; about 6 tons of yellowfin tuna were caught and landed at Honolulu. Six stations were fished in the Christmas Island area; three as close inshore as practicable and three stations 30 miles offshore. The average yield of tunas for all stations was 8.2 per hundred hooks for the 6-hook baskets (0.52 per basket), and 4.9 per hundred hooks for the 11-hook baskets (0.57 per basket). The station 30 miles to the west (leeward) of Christmas Island produced the best catch; here the rate was 12.5 per hundred hooks for the 6-hook baskets and 6.8 per hundred hooks for the 11-hook baskets. The poorest station was the inshore station to the east (windward) of Christmas Island where the catch was 5.6 per hundred hooks for the 6-hook gear and 2.4 per hundred hooks for the 11-hook gear.

These yellowfin tuna were frozen and shipped to a United States west coast cannery for processing as a sample of central Pacific tuna. The outcome of this canning experiment is expected to influence the development of plans for mainland tuna boats to begin commercial fishing in the rich equatorial tuna grounds pioneered by POFI research vessels.

A shore party of two fishery scientists and two Hawaiian fishermen was put ashore for a 2-months' detail. During this period the party will install meteorological instruments loaned by the U. S. Weather Bureau and will train local cooperators to record observations of rainfall, humidity, barometric pressure, and wind velocity and direction. The field party will also prospect sites for the installation of daily recording thermometers to make a continuous record of sea-water temperatures on several sides of the island. It is hoped that the data from these instruments, together with the weather records, will make it possible to understand the seasonal and cyclical changes in the ocean currents that ultimately affect the abundance of tuna in the equatorial fishing grounds. Christmas Island, one of the largest atolls in the Pacific, is only 2 degrees north of the equator and is ideally situated as a base for such a study, as it lies in the center of the rich new tuna grounds found by the Service's research vessels.

\* \* \* \* \*

**SKIPJACK TUNA FOUND ABUNDANT IN HAWAIIAN WATERS BY "HUGH M. SMITH."** Good concentrations of skipjack tuna were discovered in Hawaiian waters by the Service's research vessel Hugh M. Smith on a 2-weeks' tuna-scouting cruise completed at Pearl Harbor on October 27.

In 13 days of searching in two areas--one extending 300 miles south and 250 miles west of Oahu and the other reaching 250 miles northeast of the island--30 schools of shipjack (aku) were seen. The best concentrations of fish were found about 110 miles south of Oahu and in the vicinity of a large eddy about 80 miles west of the island of Hawaii. This eddy had been revealed by earlier investigations of the vessel to be a more or less permanent feature of the pattern of ocean currents around the Hawaiian Islands. It was considered likely to offer good fishing, as such eddies often bring about a concentration of the small fish and animals upon which the tuna feed. Skipjack were also abundant in the same vicinity at the time of the Hugh M. Smith's September cruise. On this latest cruise, schools were found as far as 300 miles to the south and west of Oahu, but they were less numerous than in September, and while scouting north and east of Oahu in four days of scouting only two schools were seen.



SKIPJACK TUNA

The skipjack (aku) is by far the most important species in the Hawaiian Islands' fisheries and is the only one that supports a canning industry. The local skipjack research program of the U. S. Fish and Wildlife Service, in cooperation with the Territorial Division of Fish and Game, has as its aim the discovery of concentrations of this tuna species which will permit the fishery to expand beyond its present narrow geographical and seasonal limitations. The operating range of the Honolulu-based skipjack sampan fleet does not extend as far from land as the area where the Hugh M. Smith found fish most abundant.

During this cruise, experiments with possible substitutes for scarce live-bait were continued in cooperation with the University of Hawaii. The search for a bait substitute for the skipjack fishery has led to the use of chemical attractants in combination with articles which might prove attractive in appearance to the aku. As yet no good substitute has been found to take the place of the nehu, the main bait fish used around the Hawaiian Islands.



## Sea Lamprey Invade Green Bay in Lake Michigan

Sea lamprey in such vast numbers that the water literally teemed with them invaded Green Bay in Lake Michigan early in the fall of 1953, bringing fishing operations practically to a standstill, reports the Service's Branch of Fishery Biology. All important commercial species were attacked, and so great was the destruction that dead and dying fish littered the surface of the water. Fishermen of northern Green Bay had removed most of their gear from the water by the end of September because they were discouraged by dwindling catches, the presence of large numbers of lamprey in their nets, and the necessity of discarding a high percentage of mutilated fish in their catches.

Both trap netters and gill netters suffered. Trap-net fishermen reported as high as 60 to 70 percent of their catch scarred and many fish dead when the nets were lifted. Gill netters fared even worse. One of the last fishermen to remove his large-mesh gill nets from Big Bay de Noc took between 4,000 and 5,000 pounds of dead fish from each of two gangs.



SEA LAMPREY FEEDING ON A TROUT.

Fishermen captured large numbers of sea lamprey in addition to those taken in their nets. Some removed daily as many as 20 that had attached themselves to their boats. Others added to their take of hitchhiking parasites by towing a white box astern. Although the fishermen are to be commended greatly for their efforts in destroying as many sea lamprey as possible, there is small chance that they made any important inroads on such a tremendous population.

The 1953 invasion was a rude shock to commercial operators who had begun to hope that the sea lamprey menace was fading. After considerable destruction in 1949 and 1950, lamprey depredations in Green Bay were relatively limited in 1951/52 and increased only slightly in the fall and winter of 1952/53. This past fall's experience proves that the respite was only temporary and that the threat to fish stocks is greater than ever.

The movement of sea lamprey into shallower water in the fall is normal behavior for that predator, according to the Service's fishery research biologist who visited the Green Bay region September 14 to 18 to study the situation. "According to our best knowledge of the lamprey's life history," he explained, "the newly transformed parasitic-phase sea lamprey go at once to deep water when they leave the streams in late fall or early spring to take up their lake existence. They remain at the greater depths during the summer but move shoreward as fall approaches.

"During their stay in deep water the sea lamprey formerly attacked chubs, lake trout, and burbot. With the last two species practically extinct in Lake Michigan, the chubs doubtless are bearing the brunt of the lamprey's summer feeding. The fact that the larger chubs are of more suitable size as prey for the lamprey may be a factor in the increasing dominance of small fish in the chub-net catches.

"It is after the onshore movement of lampreys toward shallow water," the biologist continued, "that such species as whitefish, lake herring, walleyes, suckers, and perch suffer greatest damage. Lamprey attacks are especially harmful at this season because of the relatively large size of the parasite. Feeding can be expected to continue actively during the fall, but to decrease gradually during the winter, and come completely to an end some time before the lamprey enter the streams to spawn in the spring.

"The million-dollar question for the fishing industry of Green Bay," he concluded, "is whether enough fish have survived this fall's destruction to support future fishing operations at a good level of production. Time alone can give the answer."



## Wholesale Prices, November 1953

In spite of lighter landings, a considerable drop in demand caused wholesale prices for edible fishery products to drop from October to November. However, prices in November 1953 were higher than for the same month in 1952. The over-all edible fish and shellfish (fresh, frozen, and canned) wholesale index for November 1953 was 106.1 percent of the 1947-49 average (see table)--lower than October by 4.7 percent, but 6.7 percent higher than a year earlier.

The largest decline was in the drawn, dressed, or whole finfish subgroup--November 1953 prices were 13.3 percent under the previous month and 18.6 percent below November 1952. Catches were generally light and the demand light. Prices of all items in this subgroup were lower than in October, except lake trout prices at Chicago which remained unchanged. Large drawn offshore haddock prices at Boston in November dropped 22.0 percent below October and were 28.6 percent less than a year ago. West Coast salmon and halibut at New York City both sold below October prices. But salmon prices were higher than a year ago, while halibut prices were 33.0 percent lower.



NEW YORK'S PECK SLIP, THE WHOLESALE FRESH-WATER FISH MARKET.

Table 1 - Wholesale Average Prices and Revised Indexes for Edible Fish and Shellfish, November 1953 and Comparisons									
Group, Subgroup, and Item Specification	Point of Pricing	Unit	Avg. Prices <sup>1</sup> (\$)		Indexes (1947-49 = 100)				
			Nov. 1953	Oct. 1953	Nov. 1953	Oct. 1953	Sept. 1953	Nov. 1952	
<b>ALL FISH AND SHELLFISH (Fresh, Frozen, and Canned)</b>									
<b>Fresh and Frozen Fishery Products:</b>					114.6	122.7	112.3	125.8	
<b>Drawn, Dressed, or Whole Finfish:</b>					112.8	120.1	113.0	138.6	
Haddock, large, offshore, drawn, fresh	Boston	lb.	.12	.16	126.4	162.0	114.9	177.0	
Halibut, Western, 20/80 lbs., dressed, fresh or frozen	N.Y.C.	"	.30	.30	91.8	93.9	92.3	137.0	
Salmon, king, lge. & med., dressed, fresh or frozen	"	"	.52	.55	115.7	123.9	114.2	109.7	
Whitefish, mostly Lake Superior, drawn (dressed), fresh	Chicago	"	.35	.49	85.5	121.5	154.9	109.1	
Whitefish, mostly Lake Erie pound or gill net, round, fresh	N.Y.C.	"	.50	.52	101.1	104.1	148.6	94.0	
Lake trout, domestic, mostly No. 1, drawn (dressed), fresh	Chicago	"	.53	.53	107.6	107.6	97.3	120.9	
Yellow pike, mostly Michigan (Lakes Michigan & Huron), round, fresh	N.Y.C.	"	.44	.45	102.0	105.5	140.7	96.1	
<b>Processed, Fresh (Fish and Shellfish):</b>					119.3	118.5	116.2	113.8	
Filletts, haddock, sml., skins on, 20-lb. tins	Boston	lb.	.38	.38	129.3	129.3	112.3	129.3	
Shrimp, lge. (26-30 count), headless, fresh or frozen	N.Y.C.	"	.68	.67	107.9	106.4	105.4	96.4	
Oysters, shucked, standards	Norfolk area	gal.	5.25	5.25	129.9	129.9	129.9	129.9	
<b>Processed, Frozen (Fish and Shellfish):</b>					107.0	103.4	101.4	102.8	
Filletts: Flounder (yellowtail), skinless, 10-lb. pkg.	Boston	lb.	.31	.31	108.7	108.7	108.7	119.2	
Haddock, sml., skins on, 10-lb. cello-pack	"	"	.27	.27	100.4	98.6	93.0	93.9	
Ocean perch, skins on, 10-lb. cello- pack	Gloucester	"	.22	.22	105.9	105.9	104.7	114.4	
Shrimp, lge. (26-30 count), 5-lb. pkg.	Chicago	"	.71	.66	109.9	102.2	101.1	94.9	
<b>Canned Fishery Products:</b>					94.5	94.5	94.0	94.7	
Salmon, pink, No. 1 tall (16 oz.), 48 cans per case	Seattle	case	17.70	17.70	93.9	93.9	93.9	99.1	
Tuna, light meat, solid pack, No. 1/2 tuna (7 oz.), 48 cans per case	Los Angeles	"	15.30	15.30	95.5	95.5	95.5	90.5	
Sardines (pilchards), Calif., tomato pack, No. 1 oval (15 oz.), 48 cans per case	"	"	9.25	9.25	108.0	108.0	108.0	109.4	
Sardines, Maine, keyless oil, No. 1/4 drawn (3 1/2 oz.), 100 cans per case	N.Y.C.	"	8.20	8.20	87.3	87.3	81.9	76.6	
<sup>1</sup> REPRESENT AVERAGE PRICES FOR ONE DAY (MONDAY OR TUESDAY) DURING THE WEEK IN WHICH THE 15TH OF THE MONTH OCCURS.									

<sup>1</sup>/REPRESENT AVERAGE PRICES FOR ONE DAY (MONDAY OR TUESDAY) DURING THE WEEK IN WHICH THE 15TH OF THE MONTH OCCURS.

Prices of large shrimp at New York City in November increased 1.4 percent as compared with the previous month and was the only item in the fresh processed subgroup to register a change. Shrimp supplies were good and the demand was very good. Haddock fillets and shucked oysters were priced the same as in October. The same situation prevailed when comparisons are made with November 1952 prices--shrimp was up 11.9 percent and haddock fillets and oysters were priced the same.

The November frozen processed fish and shellfish index was up 3.5 percent as compared to October, due to higher shrimp and haddock fillet prices. Flounder fillet and ocean perch fillet prices remained the same as the previous month. Compared with a year ago, haddock fillets and shrimp were priced higher while flounder fillets and ocean perch fillets were priced lower.

There were no changes in the prices of the canned fishery product items from October to November. However, there were some changes from a year earlier, with Maine sardines 14.0 percent higher and canned tuna up 5.5 percent; pink salmon and California sardines were down slightly when compared with November 1952.



#### CALIFORNIA-TAGGED ALBACORE RECOVERED OFF JAPAN

The first authentic record of transpacific migration by an albacore (*Thunnus germo*) was obtained by the California Department of Fish and Game in July 1953 through the return of a tag from Japan. Japanese fishermen aboard the vessel

Chesho Maru No. 5 of Mie Prefecture noticed the fish when it was caught on hook and line 550 miles south of Tokyo (latitude  $31^{\circ}30'$  N., longitude  $149^{\circ}40'$  E.) on June 23, 1953. The fish was one of 215 albacore tagged by the Department of Fish and Game during August 1952.



The fish was tagged on August 4, 1952, 18 miles south of Los Angeles, California (latitude  $32^{\circ}25'$  N., longitude  $118^{\circ}15'$  W.). It had moved 4,900 miles west and had been out 324 days since the time of tagging. A type "F" tag of blue vinylite tubing secured with nylon line had been used. The fish was 76 cm. (30 inches) long when tagged. No valid information as to size or general condition was obtained at the time of recapture.

There were two earlier recoveries from the same group of tagged albacore, both off Morro Bay, California. Both of these fish had traveled about 200 miles northwest from the same point of release as the individual recaptured off Japan and had been out 30 and 43 days, respectively.

--California Fish and Game, October 1953



### Argentine Republic

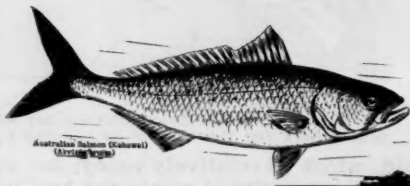
**FISHING DISCUSSIONS WITH JAPANESE DELEGATION:** Various aspects of the fishing industry in Argentine waters "and its exploitation in the south of the Republic" were discussed at a meeting between the President of the Argentine Republic and a delegation of Japanese legislators. Details of the conversation were not revealed other than the fact that the legislators were "men of great experience in fishing activities in their country," reports an October 26 U. S. Embassy dispatch from Buenos Aires.



### Australia

**NEW FISH CANNING PLANT:** A new fish and fruit cannery will be established at Ballina, New South Wales, Australia, reports the September 1953 Fisheries Newsletter, an Australian fishery magazine. The plant will can mullet and Australian salmon, and hopes to develop an export trade in canned shrimp.

About 60 percent of the total output will be fishery products. The plant was scheduled to commence operations in November 1953, and at the start will handle 8,000 pounds of fish and 200 cases of fruit (in season) daily. The capacity could easily be doubled or trebled.



### Canada

**GOVERNMENT TO SURVEY FISH PROCESSING PLANTS:** As a preliminary step towards the improvement in quality standards and inspection of fish generally, the Canadian Department of Fisheries has commenced a survey of plants now producing fish for interprovincial or international trade. Cooperation of the industry in this survey was sought by the Deputy Minister in the following letter to the Fishery Council of Canada:

"As you know, the establishing and maintaining of high standards of quality in Canadian fish and fish products sold on domestic and export markets has been a difficult problem for government and industry for many years. In general, the problem should be considered in respect of both the quality of the product and the conditions under which it was produced and packed.

"To accurately establish the extent of this latter phase of the problem and to obtain factual data which might assist in its solution, the Department is beginning at once a survey" of all plants in Canada handling fresh, frozen, salted, and pickled fish for interprovincial or international trade.

The letter continues: "The survey will be made jointly by members of the Inspection Service of the Department and members of the Fisheries Research Board. It is hoped that the data will be ready for assessment by January 31, 1954. Along with the survey will be a critical examination of existing standards and techniques for fish and fish products and a consideration of new or improved standards which might be applied even to those species and products not subject to official inspection at this time.

"I should be grateful for the fullest support and cooperation of the members of the Fisheries Council in the plant survey program. There is no doubt that the technological and engineering service of the Fisheries Research Board can, on request, be of considerable assistance to industry in any remedial measures which may be found necessary as a result of the expert examination of each plant."

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**NEW SCALLOP BED DISCOVERED OFF NOVA SCOTIA:** A new scallop bed with good commercial possibilities has been discovered in the northwestern portion of St.

Pierre Bank, about 120 miles east of Louisburg, N. S., reports the September 1953 Trade News, a Canadian Government publication. The discovery was the result of offshore scallop investigations planned and carried out for the Federal Department of Fisheries by the Atlantic Biological Research Station of the Fisheries Research Board of Canada at St. Andrews, N. B.



NORTHWEST ATLANTIC FISHING GROUNDS OFF NEWFOUNDLAND, NOVA SCOTIA AND THE GULF OF ST. LAWRENCE.

Tests made with standard deep-sea scallop gear used offshore by the commercial fleet have brought up catches comparable to those made on Georges Bank, both in size of catch and quality of the meat. The stocks on the St. Pierre bed average  $4\frac{1}{2}$  inches in length and about 25 meats are required to make a pound. The specimens caught in exploratory dragging were almost exclusively six years

old, which is relatively young; and with the rapid growth still occurring it is expected that the quantity of meats per haul will be considerably better in 1954. The test catches varied from 10 to 24 bushels for a 45-minute haul, representing an estimated yield of from 45 to 110 pounds of meats per haul.

For its exploratory scallop studies, the Department first chartered the dragger Elaine W in July. The work was continued in August and September by the Irish Patriot, and it was this vessel which discovered the new bed.

The St. Pierre scallop bed is about 25 square miles in area, occupying a position between  $46^{\circ}19'$  and  $46^{\circ}26'$  north latitude, and between  $57^{\circ}00'$  and  $57^{\circ}05'$  west longitude, at depths of from  $19\frac{1}{2}$  to 24 fathoms. In addition to this bed, which can provide the basis for an important new offshore fishery east of Nova Scotia, the Department's explorations have indicated that other areas might have commercial possibilities, and these are being investigated further.

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**REPORT ON DEVELOPMENT OF NEWFOUNDLAND'S FISHERIES:** The recommendations made to the Governments of Canada and Newfoundland in the Newfoundland Fisheries Development Committee Report constitute a proposed program of integrated activity in that province on the part of the federal and provincial government departments as well as private enterprise.



The Committee was established in January 1951 by joint agreement between the Government of Canada and the Government of Newfoundland under the chairmanship of Sir Albert J. Walsh, Chief Justice of Newfoundland. The members represented the fishermen of Newfoundland, the fish processors and exporters, the Department of Fisheries of Canada, and the Department of Fisheries and Cooperatives of Newfoundland.

According to its terms of reference, the Committee's task was to study the fishing industry of Newfoundland with a view to the more effective utilization of its fishery resources "through methods of fishing and processing based on sound scientific, economic, and social considerations."

Before the establishment of processing plants for production of frozen fillets, the prosecution of the fisheries of the province was based mainly on cod, herring, salmon, lobster, seals, and whales; the salted cod industry was dominant both as to number of persons employed and value of production. After the establishment of these plants and prior to the introduction of draggers into the industry, the position remained unaltered, the production of processing plants being almost entirely frozen cod fillets. After World War II, draggers were introduced into the Newfoundland fishing industry by the fillet-producing companies and production was broadened to include ocean perch (red-fish), haddock, plaice, and flounder, with some utilization of other species. Although the production of salt fish has declined, the cod fishery continues to be the most important branch of the fisheries.

In its investigations, the Committee had at its disposal the services of an expert research staff, provided by several departments of the Federal and Provincial governments, who carried out a number of special surveys and studies on the Committee's behalf. These included reports on the working conditions and income position of fishermen, the location and extent of fishery resources, the nature of the markets for fish products, catching methods and equipment, processing plants and techniques, costs of production and distribution, and the like. In some cases, the Committee and its investigators sought the assistance of specialists outside the government services. For example, officials of the Food and Agriculture Organization of the United Nations visited Newfoundland on the Committee's invitation to supply special information on fishing craft and gear.

The main objective in the proposals contained in the Committee's submission is the raising of the income of the individual Newfoundland fisherman, for which increased productivity is vital.

#### The Committee suggests:

Further exploration and study of stocks; modernization of the fishing fleet; training facilities for fishermen; maintenance and harbor service facilities for fishing craft; harbor improvements; complete modernization of the processing industry; selection of the best locations for processing operations, especially in the northern parts of the province; road construction to connect new processing with arterial highways; community development and housing to accommodate relocated fishermen and their families.

Before going into detail with regard to its recommendations, the Committee's report deals with the background of the Newfoundland fisheries and the existing situation. It points out that the 1951 census showed upwards of 20,000 fishermen in Newfoundland and Labrador, and that the number has declined as new employment has become available. However, isolation and, among older men, economic and social ties reduce mobility. About 75 percent of all fishermen in the Province, the report says, depend wholly or mainly on the production of dried-salted cod, and the market for this appears

to be static, while that for certain other fishery products is gradually expansible.

Summed up, the Committee's comments on the salt fish industry in its present condition are that productivity is low, the average annual output per man being under 50 quintals (5,600 pounds) of finished product. This means a gross of about C\$500 per year. The income of typical fishermen's families apparently today averages less than C\$1,500 (in cash and kind), somewhat over half of which is derived from fishing. Most fishermen are operating on credit advanced at the beginning of each season by the merchant-suppliers who also provide the outlet for the fishermen's production. Besides being isolated in many cases, fishing communities lack many of the amenities of North American life.

The report explains that enterprise in the salt-fish industry takes the form of a fishing crew of three or four men responsible for curing the fish as well as catching it. Investment in equipment--boats, gear, and premises--is meagre, averaging about C\$500 per man. Fishing is thus restricted to



inshore waters, where the season is short and the run of fish sporadic. The necessity of being close to fishing grounds has drawn families to remote headlands and islands where living conditions generally are poor.

In the opinion of the Committee, the solution lies in increased physical productivity, since any conceivable rise in prices can have but a minor effect in raising the income of the fishermen. To achieve any such considerable increase, fishermen must have more efficient equipment and must be relieved of the responsibility of processing their catches. This implies concentration of fishing fleets around processing plants operated under specialized management. It follows that modernization involves some withdrawal from the widely scattered "outports" and centralization of the fishing industry at a smaller number of locations.

In this connection the report observes that progress in modernization has already been made on the South Coast, where there is year-round fishing and access to offshore grounds. Modernization in the northern areas, where over 40 percent of all fishermen live, is a more difficult problem, says the report. From the Strait of Belle Isle to Cape Bonavista, fishing is restricted at best to a season of eight months even for modern craft. This raises a serious impediment to the profitable operation of costly fishing craft and processing plants. The Committee observes that richer resources might be a compensating factor, but these have not really been proved to exist in the region. The resources appear to be sufficient, however, to provide quite good returns for the newer types of fishing boat, and these could be supplemented in many cases by winter fishing at South Coast ports.

For a number of reasons--locational disadvantage in the north, length of season, etc.--salt-fish processing, rather than filleting and freezing, is recommended by the Committee as the basis for centralization in the northern areas. Diversification of the enterprises concerned is desirable, however, and could be brought about by utilization of species other than cod, such as ocean perch and herring, by preparation of other products, such as frozen fillets and fish meal, and by marketing products through enterprises elsewhere.

The committee recommends exploration and extended study of the fish stocks in Newfoundland waters. Increased facilities locally for the investigation of technological problems peculiar to the industry in Newfoundland are also recommended.

The report says that increased building and equipping of fishermen-owned craft would be needed and that fishermen would have to be trained in the use of modern equipment and methods. Facilities for maintenance and service of fishing craft, i.e., marine railways and repair shops, would have to be developed, and harbor improvement and navigational aids would be needed in some cases.

In connection with the modernization of the processing industry, the Committee finds that the filleting and freezing branch is developing generally along satisfactory lines. The main concern is with the production of dried-salted cod, particularly on the Northeast Coast. As indicated, modernization of this branch involves extensive relocation of activities and population.

The report recommends a survey to determine the suitability and requirements of certain locations as bases for the concentration of these operations in the northern districts. The preliminary or reconnaissance phase of this work was made last year and a newly detailed examination of a few selected locations is now in progress under the direction of the Federal Department of Mines and Technical Surveys in collaboration with other federal departments.

The report further recommends that development be pushed as rapidly as possible at such locations. This development would take the form of marine works, navigation aids, and marine radio-telephone service provided by the federal Departments of Public Works and Transport; power, water supply, and other municipal services provided by provincial authorities; and assistance for vessel construction, training and housing provided on a agreed share by both governments.

The report proposes that the Federal Government should construct roads connecting "northern development centres" with the arterial highways system of the Province, on the premise that the program is one of rehabilitation.

Housing needs are already becoming acute at centers where the industry has begun to develop, and further development, involving the building up of new communities and the expansion of others, would intensify those needs. The report, therefore, lays special stress on assistance for housing.

The report expresses hope that provision of the combined services outlined would be sufficient to induce private enterprise to undertake the necessary business organization and establish central curing stations and auxiliary plants. It is suggested that the fishing industry, while it would draw population from the settlements most disadvantageously located at present, might not greatly affect those where the traditional fishery is just sufficiently attractive to hold the older men who have some stake in their fishing equipment and family property. In such cases, the report recommends that separate fishing crews be encouraged to combine their operations on a cooperative basis and build up an organization and plant capable of utilizing mechanized methods of processing. For this purpose, a program of education for fishermen in techniques of cooperative organization of production and marketing is recommended. Experimental projects of this kind, the report says, should be carried out at one or two favorable locations.

The report implies that a development program should proceed as follows: 1) selection of locations on the basis of a thorough survey of potentialities; 2) federal-provincial preparation of plans for provision of facilities and services; 3) offering of such services at these locations to the interested public, leaving initiative for their acceptance to private enterprise; and 4) a three-way effort to carry out each project.

In the market context of the foreseeable future, the Committee considers that a substantial withdrawal of men from the fisheries of Newfoundland is clearly necessary if the productivity of the individual is to be raised.

NOTE: COPIES OF THE FULL REPORT (NEWFOUNDLAND FISHERIES DEVELOPMENT COMMITTEE REPORT) ARE OBTAINABLE AT C\$1.00 EACH FROM THE QUEEN'S PRINTER, OTTAWA, CANADA; OR ST. JOHN'S, NEWFOUNDLAND. (SEE P. 56 OF THIS ISSUE FOR REVIEW.)

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EXTENT OF FEDERAL AID FOR DEVELOPMENT OF NEWFOUNDLAND'S FISHERIES: The Canadian Federal Government will not take part in any plan to build new fish plants, curing stations, roads, or other special projects in Newfoundland on the basis of the Walsh Report's development program, an October 6 U. S. consular dispatch from St. John's reports.

Federal aid would be confined to works already begun: wharves, breakwaters, aids to navigation, experimental fishing, etc. The Canadian Premier said that there are about 800 fishing settlements in Newfoundland and there never could be modern new fishing plants set up in all of them. Plans and surveys would go forward to determine which were the best ones and these would receive special development. The fishing settlements now chosen for attention were named; LaScie and Badger's Quay-Valleyfield in particular were places where fairly large-scale attention would be given.

The Government of Canada would do the digging and the building of breakwaters, wharves, breastworks, and provide aids to navigation. The Government of Newfoundland would enable the building of the fish plants and other fishery establishments, as well as roads, water and sewerage, etc. Both Governments would bear the cost of public housing. The Province's newly-established Fishery Development Authority would take charge of the whole fishery development program, insofar as it is provincial in jurisdiction and cost. The Premier guessed that the first seven projects would cost about C\$5,000,000 to build. Since one or two were to be exclusively Federal, he estimated that the Federal Government would spend about C\$3,000,000 of the total, and the Newfoundland Government about C\$1,500,000. In later development projects, he added, over half of the cost would fall on the Newfoundland Government.

Apart from this spade work to be done by Federal funds, there appears to be a commitment on the part of the Federal Government to offer Newfoundland fishermen an opportunity to take school instruction as a part of the "extension of normal services to Newfoundland." No details are yet available with respect to this vocational training program.

The Federal Government's announcement has been deeply disappointing to fishermen. They now realize that as things have shaped up, whatever is done for the development of the fisheries will have to be accomplished almost entirely by the Province.

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NEWFOUNDLAND GOVERNMENT TO AID ITS FISHERIES: A summary of the Provincial subsidies and financial aid to fishermen and fisheries interests during the past five years was announced on October 2 by Newfoundland's Premier. A resume of his statement as reported in an October 13 U. S. consular dispatch follows:

Total aid to the fisheries during the past five years, said the Premier, "exceeded C\$6,000,000." The new filleting plant established at Gaultois was set up "mainly by money provided by the Government." The new fish meal plant at Bonavista was "put up mainly with Government help;" the new filleting plant at Trepassey is being built and equipped mainly through Government credit; the new filleting plant being built at Grand Bank is being "built and equipped by a Provincial loan of nearly one million Canadian dollars." Three other filleting plants, one at St. Anthony, one at South Dildo, and a third in Labrador were financially rescued from failure by Provincial money, he said.

Newfoundland Government money, he said, also helped the filleting plant at Fermeuse to purchase two new dragners and Provincial loans were made to six filleting firms to help them get new vessels. Other loans, he said, had permitted fishery operations to reopen at Joe Batt's Arm, and are presently opening up plants at Greenspond and Long Harbour. These are small projects of no important commercial status. Money had also been loaned to "numerous fishermen to help them buy boats, engines, fishing gear, et cetera."

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**NEWFOUNDLAND'S 1953 SALT-FISH PRICES:** Salt-fish prices to Newfoundland's fishermen at St. John's for the 1953 season were announced on October 5, 1953. These prices were lower in all cases than those paid in 1952, reports an October 6 U. S. consular report from St. John's. The prices at St. John's follow:

Type	1953	1952
	.. C\$ per quintal (112 lbs.) ..	
Madeira, large .....	10.50	12.50
Madeira, small .....	9.50	12.00
Large and medium thirds .....	8.50	11.00
Small thirds .....	7.75	10.50
Tomcods .....	7.25	11.00
West Indian, large and medium	5.00	7.25
West Indian, small .....	4.00	6.75
Ordinary cure .....	6.10	8.50-9.00

It was also agreed that if market returns warrant higher prices, merchants and fishermen will share the additional profits, the larger share going to the fishermen. Fishermen's prices undoubtedly will be lower at other ports.

At St. John's the first dollar of extra profit "over and above that expected from the market" will be divided 65 percent to the fishermen and 35 percent to the merchants.

Returns over and above C\$1.00 will be divided 75 percent to the fishermen and 25 percent to the merchants. These prices were not acceptable to the fishermen at first, but they finally agreed to recognize them. The fishermen claim that the new prices do not compensate them for the cost of production and that severe handicaps to all and disaster to many are to be expected. The Newfoundland Federation of Fishermen announced that it will appeal to the Federal Department of Fisheries for some financial assistance to bring the new prices in line with present production costs.



COD BEING DRIED IN THE SUN ON "FLAKES" AT HARBOR GRACE, NEWFOUNDLAND, CANADA.

This season's prices are from C\$2 to C\$2.50 lower in most cases than the previous year's prices.

Fishermen voiced their protests to these lower prices, and on October 12 the Provincial Government announced an advance of up to C\$1.50 per quintal for salt cod prices to producers, according to an October 16 U. S. consular dispatch from St. John's. This will meet the difference between 1952 prices and the opening prices for 1953. The Premier said that in doing this the Government was satisfied that the foreign market demand was good enough to warrant the payment of 1952 prices.

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**RECORD WHALE CATCH OFF BRITISH COLUMBIA:** A record catch of 539 whales of various species was made off the northern coast of Vancouver Island, British Columbia, in 1953, reports the September 1953 Trade News, a Canadian Government publication.

A company situated at the head of Quatsino Sound operated the only whaling plant in B. C. Each man participating in the hunt was paid a bonus of C\$150. It also reported that the sperm oil production was far greater than whale oil from baleen whales.

## Greenland

COD-PRODUCING FIRM TO INCLUDE OTHER SPECIES: The Danish-Norwegian-Faroe Islands company producing cod in West Greenland plans to expand its operations to include other species, according to a report of one of the directors to Fiskaren (September 23, 1953), a Norwegian trade magazine. For example, there are large stocks of halibut which the company expects to utilize next summer. If regulations regarding fishing in inshore waters can be changed so that Norwegians and Faroe Islanders can fish in these areas, large resources of ocean perch and wolffish (catfish) will become available. For the processing of wolffish, a fillet plant will be erected. Frozen wolffish fillets are expected to be an important export item in the future.



## Netherlands

TEN-YEAR RECONSTRUCTION PROGRAM PLANNED FOR FISHING FLEET: A large part of Holland's fishing fleet of 469 vessels will be scrapped and replaced by new construction during the next 10 years, according to the May 1953 Fisheries News-letter, an Australian trade magazine. A smaller more efficient fleet of 248 vessels is recommended in the Tinbergen Report recently presented to the Minister of Agriculture, Fisheries and Food.

The report is the result of more than a year's study by a 20-man committee, representing the Government, the fishing fleet, factory owners, and fishery unions, under the chairmanship of the Director of the Central Planning Bureau. The report further recommended Government financing of 50 percent of the estimated cost of about £5 million (US\$14 million) of such improvements.

Due to the steady drop in the average daily catch in the North Sea since the end of World War II (now less than 50 percent of the 1945 average), the committee also recommended the construction of 3 long-distance trawlers costing about £500,000 (US\$1.4 million).

Noting the low rate of fish consumption in Holland, the report said that greater emphasis should be placed on the substitution of fish for meat as a protein food, and recommended a 20-percent increase in fish consumption.



## Iran

FROZEN STURGEON FOR U. S.: Nine tons of frozen sturgeon were in Tehran, Iran, awaiting space to the United States, reports an October 20, 1953, U. S. foreign service dispatch from Tehran. It is reported that a U. S. firm recently concluded arrangements for shipping frozen sturgeon to the U. S.



## Japan

LARGER VESSELS FOR HIGH-SEAS TUNA FISHERY: All Japanese high-seas tuna fishermen have been aware of the trend toward larger vessels and have been desirous of operating with as large a vessel as could be financed, reports the Japanese press (Nippon Suisan Shimbum, September 21, 1953). The result has been a sharp increase in demand for the larger vessels. At present there are throughout Japan about 25 vessels of the 300-ton class or larger (including some also used as freezerships), and within a year this total will probably rise to 30.



Three firms are specializing in the construction of the large fishing vessels. The bigger shipyards, in anticipation of the demand, are trying to get into this business, and one yard already has received an order for two fishing vessels in the 400-ton class. A shipyard at Shimizu is pushing preparations for construction of a 300-tonner, and several 200-ton vessels are being built in the larger yards.

This trend toward the construction of bigger fishing boats began about two years ago, and there is no telling what the future developments may be.

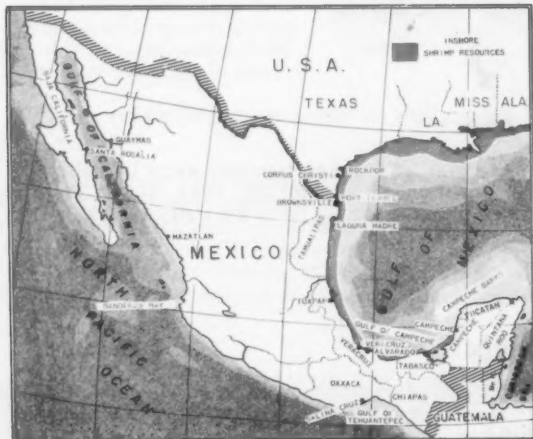
It is said that vessels operating in Eastern Pacific waters are amortizing at the rate of 35 percent on each cruise at present. In Japan these boats, which at 310,000 yen (US\$860) per ton are more expensive to build than other types of vessels, are amortizing their construction costs at the rate of only 15 to 17 percent per cruise. Thus the fishermen operating close to Japan cannot readily get the large vessels they want so badly, and financing is putting a brake on the construction boom. The size of the vessels and human attrition operate in the high-seas fisheries (principally the tuna fishery) to put a natural limitation on the length of the cruises and the number of days fishing. Consequently it is held that rather than conduct single-vessel operations with the outsize vessels of the 600-ton class which are being planned at present, it would be more effective to change over to fleet operations based on a mothership, or to land-based operations.

In the inshore fisheries, and particularly in the skipjack tuna fishery, with its violent fluctuations in the catch, small vessels will continue to be active as they are at present. Since the bait used is live sardines, it is not thought that the demand for wooden vessels will decline. They do not differ very much in cost from steel vessels at 240,000 to 250,000 yen (US\$665-\$690) per ton.



## Mexico

**FISHERIES DEVELOPMENT PROGRAM PLANNED:** Mexico is planning a large-scale program to develop its maritime resources, reports a recent U. S. Embassy dispatch from Mexico City. The program is called the "March to the Sea," and includes the development of coastwise shipping, inland waterway transportation, and land transportation facilities to connect ports with the principal industrial and commercial areas of the country.



One of the most important phases of the program is the development and expansion of the fishing industry. Unfortunately, the planners have run into practical difficulties. The Mexican diet traditionally has contained little fish, except in those areas where fish is the only meat product readily available. A commission was recently organized--la Comision Nacional de Pesca y Piscicultura--whose objectives are: (1) to make scientific and technical studies on fishing, (2) to foster an intense campaign of education and propaganda to expand the fish market; and (3) to develop a financing system to supply credit to the fishing industry. The Commission has recently published a pamphlet entitled "Fishing in Mexico--Its Present Condition and a Plan to Develop It"

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(La Pesca en Mexico, Su Estado Actual y Un Proyecto Para Impulsarla) which has received favorable comment from the President, other high government officials, and persons connected with the fishing industry.

A plan put forth by the Oficina de Estudios Generales de la Secretaria de Marina calls for the expansion of the Mexican fishing fleet to compete with foreign vessels fishing legally and illegally in Mexican waters. Furthermore, attempts will be made to keep foreign vessels out of the 15-mile territorial waters which Mexico claims to be under its jurisdiction; and action will be taken against certain Mexican companies which have received concessions from the Government but which have not fulfilled their contractual obligations. It is said that many of these companies are actually controlled by non-Mexican enterprises.

A new industry in the fishing field is apparently soon to be established in Tampico. A representative of United States interests has taken the first steps toward establishing a plant in that port for processing menhaden. Presumably, the installation would include not only oil-extracting equipment but vessels to catch menhaden as well. It was reported the total investment in the project would be approximately 30,000,000 pesos (US\$3,468,000). It is also presumed every facility will be given the new company since its objectives are so closely coordinated with the President's plan for maritime development.



### Norway

**FURTHER DETAILS ON FISH-LOCATING DEVICE (ASDIC):** Further information on "ASDIC," fish-locating device developed in Norway, indicates that the one model which will be available soon scans either automatically or manually to a distance of 5,900 feet on each side of the fishing vessel. The device can also be used as a depth finder by drawing the transducer, which normally extends about 40 inches below the keel, up to the bottom of the hull. The device usually is mounted in the hold in a cylinder about 40 inches in diameter with a manhole in the deck for access. In the pilot-house the scanning device takes no more room than a depth finder. It consumes 130 to 140 watts in current. The price of this model will be about Kr. 35,000 to 40,000 (US\$4,900-\$5,600), reports the September 16 Fiskaren, a Norwegian fishing magazine.

A smaller "ASDIC" is being constructed for use on smaller craft. It can be coupled to a depth finder and used in conjunction with it. This model can register fish within a radius of 1,640 feet and will be priced at Kr. 6,000 to 7,000 (US\$850-\$980).

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**PLASTIC FROM COD WASTE:** A Bergen fish firm is making a plastic from cod waste--called "monoplast," reports The Fishing News of June 13, a British trade magazine. The Norwegian Government is expected to give this firm financial aid to the amount of £108,300 (US\$303,000) to carry on with its production of this plastic. The firm has for some time been producing "monoplast" experimentally at its plant in the Lofoten Islands and intends to establish full commercial production at the rate of about 2,000 metric tons a year.

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**PEARLS MADE FROM HERRING-SCALE PASTE:** From the scales of herring Norwegians are making a paste for artificial pearls, reports The Fishing News of June 13, a British trade magazine. A firm at Sandefjord is producing artificial pearl necklaces made from glass beads coated with a paste made from herring scales. Production is at the rate of 12,000 necklaces a week.

NOTE: SEE COMMERCIAL FISHERIES REVIEW, FEBRUARY 1952, P. 55.



## Republic of the Philippines

**MODIFICATION OF TRADE AGREEMENT WITH THE U. S. PROPOSED:** On May 5, 1953, the Government of the Philippines submitted to the United States certain proposals for modification of the 1946 Philippine Trade Agreement. According to reports contained in the Department of State Bulletins of September 7 and October 19, 1953, these proposals provide:

1. that the present agreement be modified to provide for limited and reciprocal free trade between the two countries in such a manner that full duties would be imposed on all imports of each country except for those commodities which by agreement of the two Governments would be included in duty-free lists;

2. that the provision of the present agreement with respect to currency matters be eliminated, leaving the Philippine Government in complete control of its currency subject only to control and regulations pursuant to its commitments to the International Monetary Fund; and

3. that provisions of the present executive agreement covering immigration and the rights and privileges extended to citizens in the fields of public utilities, land ownership, and exploitation of natural resources be made reciprocal.

In view of the importance of this matter and the careful study given it by the committees designated by the President of the Philippines, the United States as a necessary first step is making a careful examination of these proposals and other aspects of current economic relations between the two countries.

For this purpose the United States Government has established an executive committee consisting of representatives of the Departments of Agriculture, Commerce, Interior, Labor, State, and Treasury, the Foreign Operations Administration, and the Tariff Commission. This committee, which will coordinate its activities with the President's Commission on Foreign Economic Policy, is actively studying the Philippine proposals, including the additional information made available in the Philippine note of August 24 with respect to the various commodities which the Philippine Government suggests for inclusion in the selective free trade list.

The Philippine Government has provided lists of items which it proposes for selective free trade, and has given an indication of its attitude on the period to be covered by the revised Agreement. Fishery products were not on the selective free trade list. Information on duties to be imposed on imports from the United States not included on the free list will have to wait the tariff revision now in preparation by the Philippine Tariff Commission. This was expected by the end of November 1953.

The Committee will first be required to determine whether, in its opinion, a basis exists for renegotiation of the 1946 Philippine Trade Agreement. The position of the United States on the Philippine proposals must await the conclusions of this Committee. In the meantime, the United States Government would welcome the views of the business community and others as an aid in forming the United States position. Such views pertaining to fishery interests may be submitted to the U. S. Fish and Wildlife Service, Branch of Commercial Fisheries, Washington 25, D. C., for the attention of the Executive Committee considering the Philippine Trade Agreement Modification Proposals.

Under the Philippine Trade Act of 1946 and the exclusive trade agreement between the United States and the Philippines, "United States articles" are exempt from Philippine customs duties. Fishery products of United States production, such as canned salmon, sardines, mackerel, or herring are free of duty. The free provisions of this Act are due to expire on July 4, 1954, when duties would be applied to United States products at percentages of the basic duties, increasing in increments of 5 percent

yearly until at the end of 20 years the full basic rates of duty would apply. Basic duties are those applied to products of other countries. Canned salmon, sardines, mackerel, and herring are dutiable at 15 percent ad valorem. Other fishery products are dutiable at rates up to 25 percent ad valorem.



## Portugal

**GOVERNMENT LOANS FOR FISHING VESSELS:** Loans to Portuguese fishing companies for use toward construction and renovation of fishing vessels will be forthcoming from a fund set up under the terms of Decree-Law 39283 of October 27, 1953. The Decree authorizes the Fishing Industry Renovation and Supply Fund to issue bonds to the amount of 50 million escudos (US\$1.7 million) for this purpose, reports a November 5 U. S. Embassy dispatch from Lisbon.



## Sweden

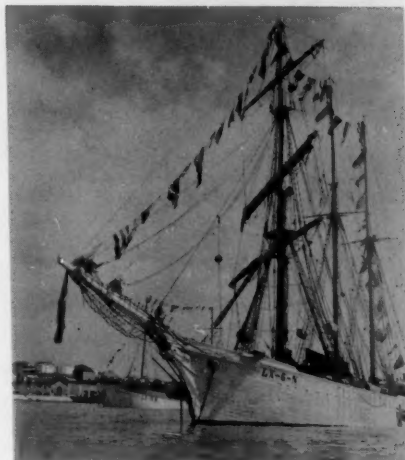
**PLASTIC TRAWL NETS:** A newly-established net factory on the island of Donso, Sweden, is manufacturing a plastic yarn for use in trawl nets, reports an October 20 U. S. consular dispatch from Goteborg. Fishermen who have tried nets made of this yarn claim that they are 5 to 7 times more durable than ordinary nets.

The plastic net is made of ordinary cotton yarn impregnated against rot and covered with plastic. Chlorinated phenols and cupric salts are used in impregnating the yarn before covering it with plastic. This yarn will not rot and has a smooth surface to which algae will not cling, making for lesser resistance when the net is pulled through the water.

Since the plastic yarn is new, its exact durability is not yet known but it is claimed results have been very good. It has also been found that the plastic yarn results in good catches. Bow nets made of plastic yarn have been tried and they remained clean since kelp and seaweed do not stick to the smooth surface.

The first plastic trawl nets were used in August 1952 and were used again in 1953; the fishermen claim this proves that the plastic yarn is rotproof. The manufacturers have received inquiries from Brazil, Palestine, and Spain, so it would seem that plastic nets may become an important Swedish export article.

Production is growing and expansion is planned. Work is going on in two shifts and there are orders to keep them busy until the end of 1953. The plastic yarn has not yet been tried for lobster and crab fishing but it is believed it will be very suitable for this purpose. The new material is about 40 percent more expensive than ordinary cotton yarn.



ONE OF THE OLDEST PORTUGUESE COD LINE-FISHING VESSELS "DECKED OUT" FOR BLESSING.

### Thailand

**REPORT ON FISHERIES RESOURCES:** The waters of Thailand--marine, fresh, and brackish--are exceedingly rich in fish, reports an October 19 U. S. Embassy dispatch from Bangkok.



EXPERIMENTAL FISHING WITH A SEINE NET IN A RIVER IN THAILAND.

Although, as a general rule, tropical waters harbor many individual species, usually none occurs in sufficient abundance so as to form a secure basis for a sustained, large-scale fishery. Fishing records and observations off Thailand indicate that several species are found in considerable abundance and that sustained, intensive fisheries can be successful. It is evident that a goodly portion of the Gulf of Thailand rates relatively high in total organic productivity in which fish is but one end product. This can be demonstrated by the high concentrations of nutrient salts available and the accompanying richness of the plankton. During the recent Danish *Galathea* marine survey expedition it was found that both nutrient salts and plankton occurred in much higher concentrations in the upper Gulf of Thailand than off Singapore.

The aquatic resources of Thailand are but partially known and this is particularly true of the populations in the offshore waters of the Gulf. Quite probably exploration operations as projected by the Department of Fisheries employing MSA-supplied vessels and equipment will encounter large, unused resources. The coastal fisheries are generally heavily fished and fairly well known, but the ecological and species relationships between inshore and offshore fish are yet unknown.

Among the commercially-valuable molluscs known from the Gulf are mussels, horse mussels, oysters, ark shells, scallops, squid, and a variety of clams. The mussels, oysters, ark shells, and clams occur in great abundance but are not greatly

used at present. Thailand, for the past few years, has imported imposing tonnages of dried squid from Hongkong. Quite probably this article could be supplied from the Gulf, at least in part.

Thailand is well known for its enormous variety of crustaceans. There are at least 50 species of shrimp known already and it is probable that many more will be discovered. In addition to the shrimp, there are several excellent species of crabs. A large fresh-water prawn is widely caught and sold and is of excellent quality. On the Indian Ocean coast and in the lower Gulf spiny lobsters are taken.



FAO EXPERT AND THAI TECHNICIANS SUPERVISING THE PREPARATION OF NESTS FOR THE SPAWNING OF COMMON CARP.

The finfish resources include a considerable array of sharks, rays, and sawfishes, many of which are fished for commercially. Apparently some species occur in considerable abundance. Products from this group include fresh, salted, dried, and smoked meat, and dried shark fins.

Direct plankton feeders, such as the various members of the herring family and anchovies, occur seasonally in large schools. They form the food for larger, predatory fishes and some species are widely employed in the manufacture of fish sauce (nam-pla). Other, larger species are salted and dried.

The mackerel family includes the little mackerel (pla-tu); this species occurs in abundance seasonally in large schools and furnishes a large part of the present marine catch. It is usually sold fresh but may be salted, dried, or cooked. Major items of gear used in the fishery for pla-tu are the Chinese and Thai purse seines and the stake trap (poh). A bonito, locally called pla-o, appears to be abundant but is exploited to a very small extent. Considerable numbers of small schools have been observed. Spanish mackerel and kingfish are popular among the consuming public and fair quantities are taken for fresh sale and for drying and salting.

A good many species are found in the jack family (Carangidae). Among these are the cavallas, crevalles, hard-tail jacks, pampanos, scads, leather jacks. Many are



caught in some quantity and they are sold fresh or salted and dried. The pomfrets (*pla chalamet*) are close relatives of the jacks and are one of the most valued species caught in Thai waters.

Among the fishes which live at or near the bottom are the groupers. Some attain a large size and all are good food fishes. The abundance is probably considerably greater than is reflected by the present catches. Many species of snappers are known and they are widely fished since they are well liked as food fishes. One of the best is the red snapper or *pla-dang*. Other groups found are the breams, porgies, drums, sea bass, and grunts. There are many species; some are brightly colored and practically all are good as table fish. Flat fishes include tongue fishes, flukes, and flounders; little is known of their abundance or distribution.

Other species of commercial importance are the sea catfishes, barracudas, and threadfins--representatives of these often furnish large catches. Mulletts and goat-fishes are found in some quantity. Sailfish, valued as a sport fish, have been caught in Thai waters but are not of great size. There may be marlin available offshore.

The marine fish found include many more known species, many of which are utilized. The coral reefs, although furnishing only small quantities of food fish, teem with brightly-colored and strangely-formed species, including angelfish, moorish idols, butterfly fish, gobies, and demoiselles.

Knowledge concerning the aquatic resources of the marine areas of Thailand is extremely limited. Many species now unknown to science will doubtless be found during exploratory work and it is quite certain that the geographic range of forms now known from other areas will be extended to Thailand.

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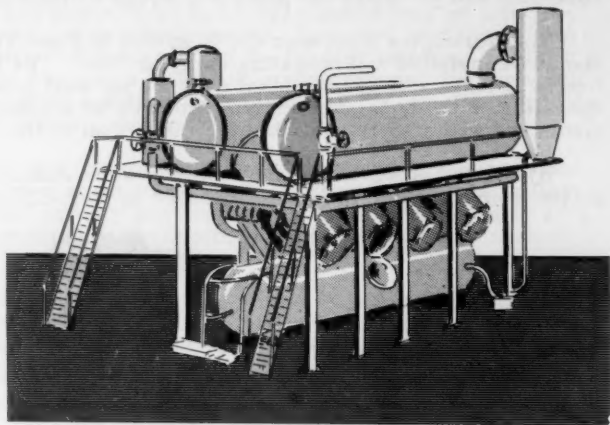
**HIGHER IMPORT TARIFFS ON FISHERY PRODUCTS:** Thailand has raised its import duties on some fishery products along with 26 other classifications by promulgation of a Royal Decree announced by the Government on September 14, 1953. The purpose of the revision as announced by the Ministry of Finance is to conserve foreign exchange by discouraging imports of nonessential commodities and to promote local industries, reports the October 24 *Foreign Commerce Weekly*, a U. S. Department of Commerce publication. For fishery products, the new rates as compared with the old are shown in the following table:

Tariff No.	Item	New Data			Old Data		
		Ad va- lorem	Specific		Ad va- lorem	Specific	
		%	Baht per kilo	U. S. equiv- alent—cents per pound	%	Baht per kilo	U. S. equiv- alent—cents per pound
2.	Fish, including crustaceans & molluscs, preserved in tins or other airtight containers. ....	33-1/3	6	22	20	4	14
3.	Fish other than preserved in tins or other airtight containers:						
	(a) Cuttlefish & beche-de-mer .....	40	8	28	20	6	22
	(c) Shark fins & awabi ..	40	12	44	20	6	22
	(d) Compoy .....	40	12	44	20	6	22
	(e) Other types, live, fresh, frozen, or ... salted .....	40	2	7	20	1	4
	(f) Other, dried, smoked, or otherwise prepared	40	8	28	20	4	14

NOTE: IF BOTH AD-VALOREM AND SPECIFIC DUTIES ARE APPLICABLE ON ANY ONE CLASSIFICATION, DIRECTOR OF CUSTOMS ASSESSES DUTY AT THE HIGHER RATE.

### Union of South Africa

**FISH MEAL INDUSTRY TO TEST STICKWATER RECOVERY PLANTS:** Experiments with stickwater recovery plants will soon be conducted on the Cape west coast by the South and South-West African pilchard meal industry, reports the September 1953 issue of The South African Shipping News and Fishing Industry Review. If the tests prove satisfactory, annual production can be increased. An extra 20,000 tons will be produced by processing the 300,000 to 350,000 tons of stickwater ejected each year as waste from the pilchard reduction factories. It is estimated that for an expenditure of £400,000 (US\$1.1 million) on stickwater plants, the industry will produce extra fish meal with a market value of more than £650,000 (US\$1.8 million).



MODEL OF STICKWATER RECOVERY PLANT.

The stickwater which will yield this extra fish meal is the waste moisture from the fish-reduction operation. In the reduction plants of the West Coast, four-fifths and more of the controlled 500,000 tons of fish caught is cooked, pressed, dried, and pulverized into meal. The moisture from the presses has further small particles removed and then goes to the oil separation plants.

Although one Cape west coast factory put up a stickwater recovery plant more than three years ago and has operated it successfully in producing condensed fish solubles, no other factory followed suit and the stickwater has continued to run uselessly into the sea. However, in Scandinavian countries after the war numerous experiments were made with simpler and less costly plants. First of all, fishery researchers concentrated on producing fish solubles as such, but in the past five years the tendency has been to re-introduce the stickwater concentrate into the fish meal to increase production and also to produce a "whole meal." This "whole meal" is claimed to have a slightly higher nutritional value than the normal meal and may eventually be accepted as the standard on the fish meal market.

From this experience it has become apparent that the re-introduction of concentrate from the stickwater in no way reduces the quality of the fish meal and may actually improve it. Confronted with the successful foreign experiments, the South African pilchard industry, and the Fishing Industry Research Institute in particular, has become increasingly interested in the possibility of installing stickwater processing plants in the West Coast factories.

The present developments started early in 1953 when the Director of the Fishing Industry Research Institute spent some time in Norway, Denmark, Holland, Germany, and Great Britain examining various stickwater plants and deciding which would render the best service in the Union and South-West Africa. In Europe there are about ten different types of plants operating.

The Director strongly recommended to the pilchard industry that it go into stickwater processing as soon as possible. Working out technical and economic data on the plants available, the list of possible plants was whittled down to three which were considered most suitable for West Coast conditions.

Of the three plants selected, one works on double-effect evaporation and was designed by a Norwegian firm. This firm agreed to send out the plant on trial if the industry would bear the cost of shipping, installation, and return freight if results were not satisfactory. One of the pioneer companies in the South African pilchard industry agreed to be the "guinea pig." This company is bearing the freight and installation costs and will purchase the plant if it works satisfactorily.

The Norwegian plant was due to arrive in Cape Town in November 1953, and should be installed and operating early in 1954. The Fishing Industry Research Institute is to judge whether the plant does its job well enough to justify keeping it. While operating on trial, the Norwegian plant will be available to the Institute for experiments and will also be available for inspection by the industry.

By the end of November negotiations were almost completed for installing trial plants from the other two manufacturers in West Coast factories.



### United Kingdom

LIGHT LANDINGS SUSPEND VOLUNTARY TIE-UP OF TRAWLERS: Light landings due to foul weather early in the fall of 1952 caused a scarcity of fish and higher prices in Britain, reports an October 8 U. S. Embassy dispatch from London. This scarcity brought a suspension in the scheme whereby 20 percent of the distant-water trawlers at Hull and Grimsby were laid up. It was first believed that the tie-up scheme would continue in effect through December. The vessel owners claim they will reimpose the restriction in November and December unless supplies remain scarce.

In general, landings from the Greenland banks were poor in the summer of 1952, 40 percent less than a year earlier. Grimsby has been particularly hard hit by the poor catch in Greenland waters and Hull trawlers have been diverted to Grimsby to supply the fish merchants there.

\* \* \* \* \*

LIGHT LANDINGS MIGHT AID PLAN FOR HANDLING ICELANDIC FISH IN BRITAIN: The fish scarcity during the latter part of 1953 in Britain due to light landings at Hull and Grimsby should aid the London financier who has contracted to handle Icelandic-caught fish, reports an October 8 U. S. Embassy dispatch from London. The landings by Icelandic trawlers, banned at British ports for many months, were expected to commence in the late summer of 1953, but failed to materialize.

The financier has acquired the necessary properties at Grimsby for icing, processing, and boxing the fish. He is also said to have purchased a fleet of trucks for distributing fish to the inland merchants and made arrangements with the British Railways for railway vans to supplement the trucks. Trade papers have speculated for months as to whether dockers would work the cargoes from the Icelandic trawlers and whether fish merchants would buy the fish. It has been rumored that the provisions departments of at least two well-known London department stores have expressed their readiness to be supplied by the London financier. Should meagre supplies of fish continue, inland merchants will risk incurring the displeasure and possible retaliatory action of the trawler owners and coastal fish merchants for the sake of obtaining adequate amounts of fish.

The financier has announced that everything is in readiness for his enterprise to begin, except the landings. He has preferred to keep the industry guessing as to when those landings will commence. At present, Icelandic trawlers are landing catches at German ports, where much of the Icelandic fish has gone since the imposition of the ban upon those trawlers by the Humberside ports. It is because the catches are more suitable for the German market, the financier says, that the trawlers have not been

diverted to British ports. He is waiting for prime-quality fish to give a rousing start to the venture, according to his spokesman.

When it seemed in September 1953 that Icelandic landings were imminent, the group of trawler owners, which had previously announced they would undersell the London businessman, cut the price of cod by three shillings a stone (3 U. S. cents a pound) which meant that cod was selling two pence (2 U. S. cents) a pound less on most inland markets. This turned out to be a short-lived benefit, however, and the originator of the scheme was most unpopular with the rest of the trawler owners. He later stated that he intended to show that his group could and would undersell the Icelandic fish at any time, but from the resulting agitation in the industry it seems that opposition from that quarter may not be entirely unanimous.

There has been great activity, too, among all the other organized groups of the fishing industry in what must be interpreted as an effort to close their ranks against the interloper. Publicity of all this activity has been widespread. The industry as a whole, as well as its component parts, has been attacked and defended in scores of papers and periodicals.

The atmosphere which has developed at the Humberside ports, and especially at the port of Grimsby, is one of great tension. This is understandable when it is considered that the ban on landings of Icelandic trawlers may be broken with no advantage gained by the British fishing industry in its dispute with Iceland.

Over and above the "fish politics" involved, the plan of the London businessman provides a real threat to the traditional methods of the fishing industry. His contract calls for fish bought at a fixed price instead of buying at the quayside auctions. He can handle his own storage, processing, and distribution, and arrange his own sales, thereby eliminating the middlemen.

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**HERRING FISHERY, 1952:** Landings of herring during the 1952 season in England, Scotland, and Wales amounted to 208,100 long tons, reports a May 20 U. S. Embassy

dispatch from London. This is an increase of 25 percent over the 166,500 long tons landed in 1951. In commenting on the 1952 season, an official of the Herring Industry Board reported: "The summer season of 1952 was quite exceptional, individual catches of herring fishing craft being the highest since the turn of the century... I venture to give the opinion that the total quantity of herring likely to become available for reduction to oil and meal in 1953 will be between 20 percent and 30 percent less than in 1952."



THE HERRING FLEET STEAMING OUT TO SEA.

During the 1952 season, 65,300 long tons of herring were reduced to meal and oil, yielding 11,900 tons of fish meal and 7,200 tons of fish oil. The previous year 27,000 long tons of herring were utilized for reduction with a production of 4,500 tons of fish meal and 2,500 tons of fish oil.

The average price of fish meal to the manufacturer in 1952 amounted to £45 (US\$126) per long ton, the same as a year earlier. The average fish oil price in 1952 was £87 10s. (US\$244) per long ton, 32 percent under the £128 (US\$358) per ton received in 1951.







# FEDERAL ACTIONS



Department of Health, Education, and Welfare

FOOD AND DRUG ADMINISTRATION

**PACIFIC OYSTER STANDARDS PROPOSED:** The Secretary of Health, Education, and Welfare on November 13, 1953, proposed that the definitions and standards of identity for Pacific oysters be amended on the basis of substantial evidence received at the public hearing held recently. The proposed amended regulations appeared in the November 19 Federal Register as follows:

## SHELLFISH; DEFINITIONS AND STANDARDS OF IDENTITY

### NOTICE OF PROPOSED RULE MAKING

In the matter of amending the definitions and standards of identity for Pacific oysters, raw Pacific oysters, shucked Pacific oysters:

By virtue of the authority vested in the Secretary of Health, Education, and Welfare by the provisions of the Federal Food, Drug, and Cosmetic Act (secs. 401, 701, 52 Stat. 1046, 1055; 21 U. S. C. 341, 371; 67 Stat. 18), and upon the basis of substantial evidence received at the public hearing held pursuant to the notice published in the *Federal Register* on September 18, 1953 (18 F. R. 6827), it is proposed that the following order be made.

**Findings of fact:**<sup>1</sup> 1. The existing definitions and standards of identity for raw Pacific oysters were promulgated on evidence received at a public hearing held in 1945. At that time a substantial volume of the production of raw Pacific oysters was packed for sale on contract to the armed services. The basis of bids for Government orders required that the size of raw Pacific oysters be indicated by count per pound or pint. Raw Pacific oysters packed for the civilian market were packed in pint jars, and there was no general usage of containers smaller than pints. The standards promulgated upon the basis of evidence received at the hearing held in 1945 specified names for the various sizes of raw Pacific oysters as follows: "Pacific oysters size ----- per pint," "Raw Pacific oysters size ----- per pint," or "Shucked Pacific oysters size ----- per pint," the blank in each instance being filled in with "5 to 8," "8 to 10," "10 to 12," "12 to 15," "15 to 18," or "over 18," depending upon the size of the oysters in the container. Beginning in September 1952, packers of raw Pacific oysters began to pack their product in 12-fluidounce jars. Within a short time only a small portion

of the production of raw Pacific oysters was packed in pint jars, while approximately 80 percent of the production was distributed in 12-fluidounce jars. The labeling of raw Pacific oysters packed in 12-fluidounce jars, with the names showing the count per pint as specified in the standard, proved to be confusing and misleading to consumers. (R. 20-30, 32-35, 41, 71-72, 75-77, 79-81, 83-84, 86, 91, 99-101; Ex. 2-3, 5-7, 9-12, 19, 22, 27, 30.)

2. Although existing definitions and standards of identity applicable to raw Pacific oysters provide for six size categories, based upon count per pint, producers of raw Pacific oysters do not customarily pack their product in more than three or four size categories. In displaying offerings of raw Pacific oysters in retail outlets, retailers have employed the terms "large," "medium," "small," and "extra small" to describe the sizes of Pacific oysters available. Retail dealers have also used these terms in their advertisements. Designation of the size of raw Pacific oysters by the terms "large," "medium," "small," and "extra small" is suitable not only for pints but is equally suitable for containers of other sizes. Recipes for oysters in most cookbooks recite cooking times based on the time required to cook raw oysters that come from the Atlantic and Gulf Coasts. Pacific oysters are significantly larger than oysters harvested on the Atlantic and Gulf Coasts and require slower and longer cooking to be rendered palatable. Housewives need recipes that give directions for cooking Pacific oysters. Amending the existing standards to provide for using the size designations "large," "medium," "small," and "extra small" will facilitate writing such recipes for distribution to housewives. (R. 21, 36, 39-40, 56, 62-63, 65, 70, 74, 78, 81, 83, 96-97; Ex. 6, 8, 14, 20-22, 25, 27, 30.)

3. Evidence was adduced that the division of raw Pacific oysters into six size categories, as provided for in the existing standards, results in considerable overlapping of sizes to the disadvantage of consumer purchasers. Reduction of the number of size categories to four would

reduce such overlapping. (R. 56, 62, 70, 82, 85, 95; Ex. 13, 16-17, 23, 26, 28, 30)

4. The term "large," as applied to raw Pacific oysters, applies to oysters of such size that a gallon contains not more than 64 such oysters. The term "medium," as applied to raw Pacific oysters, applies to oysters of such size that a gallon contains more than 64 and not more than 96 such oysters. The term "small," as applied to raw Pacific oysters, applies to oysters of such size that a gallon contains more than 96 and not more than 144 such oysters. The term "extra small," as applied to raw Pacific oysters, applies to oysters of such size that a gallon contains more than 144 such oysters. The oysters in each of the above size categories are of such uniform size that the largest oyster in the container is not more than twice the weight of the smallest oyster therein. (R. 86-89; Ex. 1)

It is concluded that it will promote honesty and fair dealing in the interest of consumers to amend the definitions and standards of identity applicable to raw Pacific oysters by revoking §§ 36.17 to 36.22, inclusive (21 CFR 36.17-36.22, inclusive), and by promulgating new sections to read as follows:

§ 36.17 *Large Pacific oysters, large raw Pacific oysters, large shucked Pacific oysters; identity.* Large Pacific oysters, large raw Pacific oysters, large shucked Pacific oysters, are of the species *Ostrea gigas* and conform to the definitions and standards of identity prescribed for oysters by § 36.10 and are of such size that 1 gallon contains not more than 64 oysters, and the largest oyster in the container is not more than twice the weight of the smallest oyster therein.

§ 36.18 *Medium Pacific oysters, medium raw Pacific oysters, medium shucked Pacific oysters; identity.* Medium Pacific oysters, medium raw Pacific oysters, medium shucked Pacific oysters, are of the species *Ostrea gigas* and conform to the definition and standard of identity prescribed for oysters by § 36.10 and are of such size that 1 gallon contains more than 64 oysters, and not more than 96 oysters, and the largest oyster in the container is not more than

<sup>1</sup>The citations following each finding of fact refer to the pages of the transcript of the testimony and the exhibits received in evidence at the hearing.



twice the weight of the smallest oyster therein.

-§ 36.19 *Small Pacific oysters, small raw Pacific oysters, small shucked Pacific oysters; identity.* Small Pacific oysters, small raw Pacific oysters, small shucked Pacific oysters, are of the species *Ostrea gigas* and conform to the definition and standard of identity prescribed for oysters by § 36.10 and are of such size that 1 gallon contains more than 96 oysters and not more than 144 oysters, and the largest oyster in the container is not more than twice the weight of the smallest oyster therein.

§ 36.20 *Extra small Pacific oysters, extra small raw Pacific oysters, extra*

*small shucked Pacific oysters.* Extra small Pacific oysters, extra small raw Pacific oysters, extra small shucked Pacific oysters are of the species *Ostrea gigas* and conform to the definition and standard of identity prescribed for oysters by § 36.10 and are of such size that 1 gallon contains more than 144 oysters, and the largest oyster in the container is not more than twice the weight of the smallest oyster therein.

Any interested person whose appearance was filed at the hearing may, within 30 days from the date of the publication of this tentative order in the *FEDERAL*

*REGISTER*, file with the Hearing Clerk, Department of Health, Education, and Welfare, Room 5440, Health, Education, and Welfare Building, 330 Independence Avenue SW., Washington, D. C., written exceptions thereto. Exceptions shall point out with particularity the alleged errors in this tentative order and shall contain specific references to the pages of the transcript of the testimony or to the exhibits on which such exceptions are based. Such exceptions may be accompanied by a memorandum or brief in support thereof. Exceptions and accompanying memoranda or briefs shall be submitted in quintuplicate.



## Department of the Interior

### FISH AND WILDLIFE SERVICE

**SUOMELA NAMED ASSISTANT DIRECTOR:** The appointment of Arnie J. Suomela, Portland, Oregon, as Assistant Director of the Fish and Wildlife Service was announced on November 27 by Secretary of the Interior McKay.

Suomela, who has been Oregon State Director of Fisheries since 1945, made a special survey of the Alaska fisheries for the Department of the Interior in the summer of 1953.

Born in Ilwaco, Washington, in July 1902, he was graduated from the University of Washington with a B.S. in fishery biology, and received his master's degree from George Washington University in 1931. For a number of years he was employed by the Bureau of Fisheries in Washington, D. C., and Seattle, Wash. He later became managing biologist of the Washington Department of Fisheries at Seattle, and in 1945 joined the Oregon Fish Commission.

Suomela is considered one of the nation's authorities on the salmon fisheries and has done extensive research in Alaska and the Pacific Northwest.

During the construction of Grand Coulee, he was in charge of field work in the Columbia River, particularly the "salmon salvage program" which resulted in successfully transplanting salmon which formerly migrated above the dam. He directed the location and establishment of runs in streams below the dam.

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### OFFICE OF TERRITORIES

**AMERICAN SAMOAN CANNERY LEASE ACCEPTED:** A five-year lease for the fish cannery in American Samoa, submitted by a San Pedro, California, fish cannery, has been accepted by the government of American Samoa, Secretary of the Interior McKay announced on October 30. The company was the only bidder in response to a public invitation to bid issued on July 7, 1953. The first year of the lease will be a trial period to determine whether the operation will be feasible and profitable.

As a minimum rental for each of the five years, the company offered \$5,000 or \$2.50 per short ton of fish processed, frozen, canned, or stored for eventual shipment or sale, whichever sum is greater.

The company intends to train Samoans in fishing skills and to develop a fishery to supply the cannery with fish caught by Samoans and to provide all jobs in the cannery to Samoans to the extent of their abilities. In addition to providing for the operation of the cannery, the lease is designed to improve the civilian economy of the islands by developing fishing skills of the Samoans and raising their income through wages. A local supply of raw, frozen, and processed fish will also be made available.



### Interstate Commerce Commission

**RAILWAY EXPRESS-RAILROADS CONTRACT APPROVED:** The contract between the Railway Express Agency and the owning railroads for the continuation of express service after February 28, 1954, was approved by the Interstate Commerce Commission early in November. A decision to this effect was made in its docket No. 31317 (Express Contract, 1954) on November 4, 1953. The Commission stated: "Upon application of the Railway Express Agency, Inc., and certain rail carriers for approval of a proposed pooling of traffic service, and earnings involved in the conduct of the express business, such pooling approved and authorized." An order to this effect was duly entered.

The new contract is to extend from March 1, 1954, to December 31, 1973, subject to the right of any carrier to withdraw from the arrangement on the first day of any month after December 31, 1958.



### CLAM CHOWDER - A POPULAR WINTER DISH



Something satisfying in the way of a savory dish particularly during these cold wintery days is clam chowder. When served piping hot it makes an excellent luncheon or dinner dish.

Take your choice, either the Manhattan Chowder with its tomatoes or the traditional New England style with its seasoned milk—either is delicious and will serve equally as well as soup or as a main dish.

Here is the favorite New England chowder recipe of the U. S. Fish and Wildlife Service's home economists.

#### NEW ENGLAND CLAM CHOWDER

1 QUART SHUCKED CLAMS  
6 TABLESPOONS DICED SALT PORK OR BACON  
1/2 CUP CHOPPED ONION  
2 TABLESPOONS FLOUR

2 CUPS CLAM LIQUOR AND WATER  
2 CUPS DICED POTATOES  
2 CUPS MILK

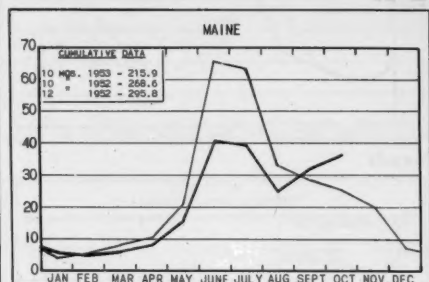
1/2 TEASPOON SALT  
DASH PEPPER  
CHOPPED PARSLEY

Drain and chop clams, saving liquor. Fry salt pork until crisp and brown. Add onion, and cook until tender. Blend in flour. Add liquor, potatoes, and clams. Cook until potatoes are tender. Add milk, seasonings, and heat. Serve immediately with chopped parsley sprinkled over the top. Serves 6.

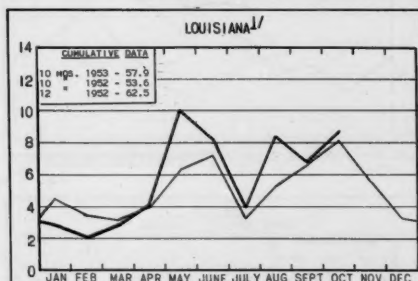
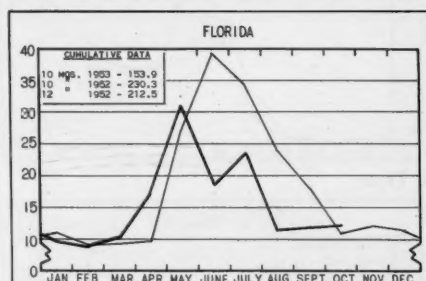
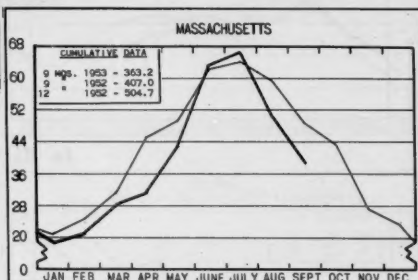
# FISHERY INDICATORS

## CHART I - FISHERY LANDINGS for SELECTED STATES

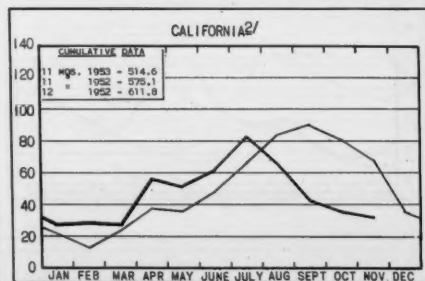
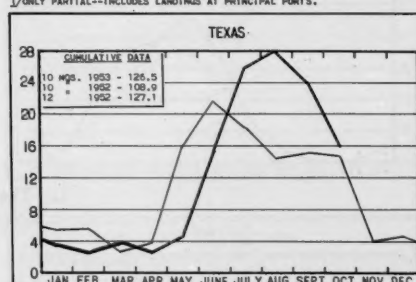
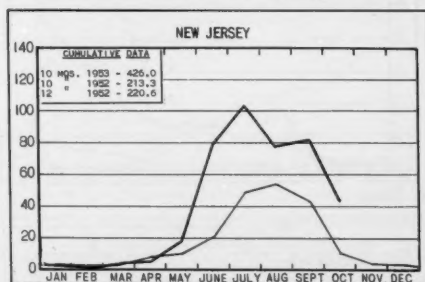
In Millions of Pounds



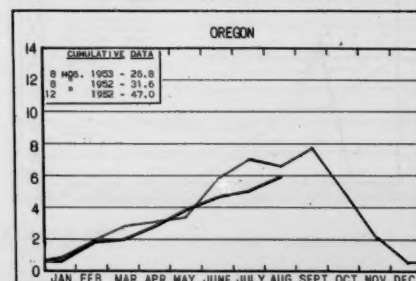
Legend:  
— 1953  
--- 1952



<sup>1/</sup>ONLY PARTIAL--INCLUDES LANDINGS AT PRINCIPAL PORTS.

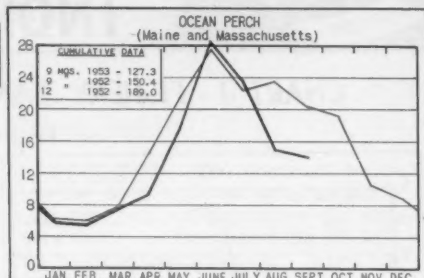
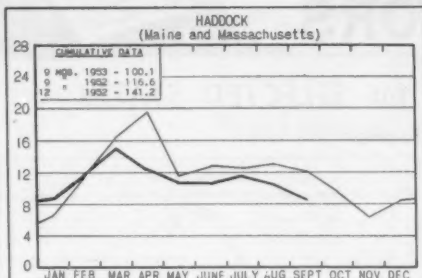


<sup>2/</sup>ONLY PARTIAL--INCLUDES PRODUCTION OF MAJOR FISHERIES AND MARKET FISH LANDINGS AT PRINCIPAL PORTS.

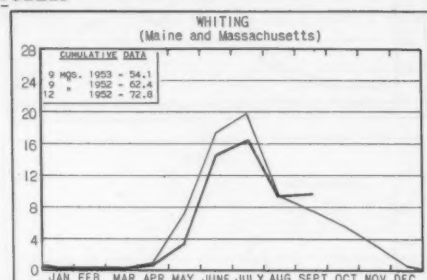
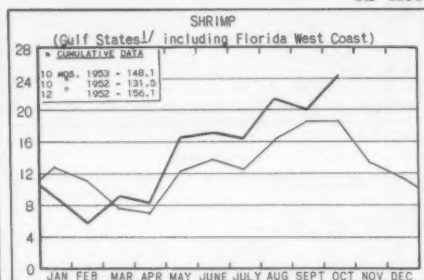


## CHART 2 - LANDINGS for SELECTED FISHERIES

In Millions of Pounds

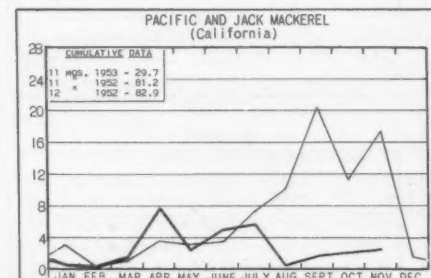
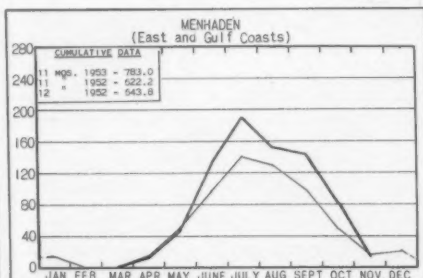


In Millions of Pounds

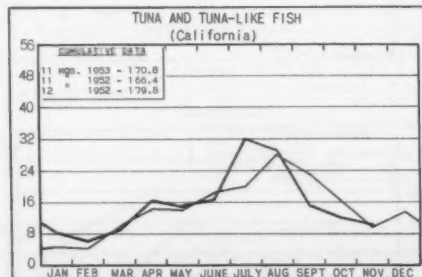
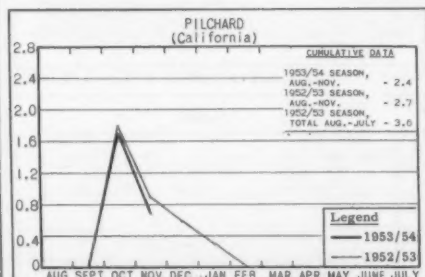


1/CA. & ALA. DATA BASED ON LANDINGS AT PRINCIPAL PORTS AND ARE NOT COMPLETE.

In Thousands of Tons

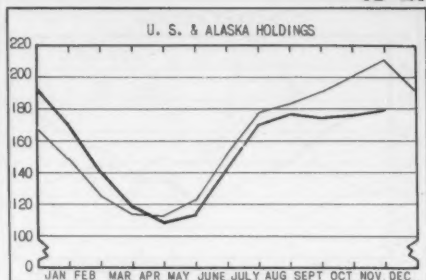


In Thousands of Tons

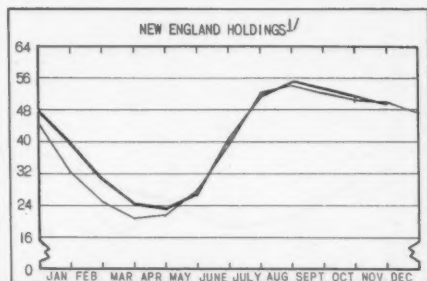
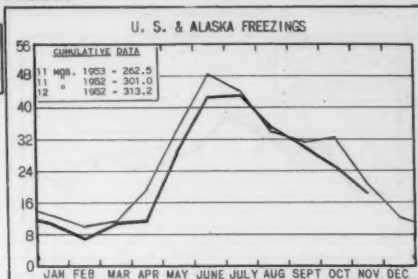


# CHART 3 - COLD-STORAGE HOLDINGS and FREEZINGS of FISHERY PRODUCTS \*

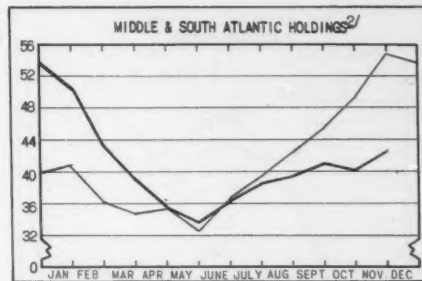
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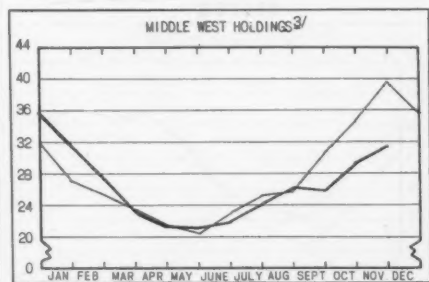
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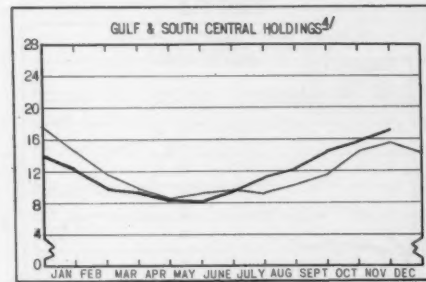
<sup>1/</sup>MAINE, MASSACHUSETTS, RHODE ISLAND, AND CONNECTICUT.



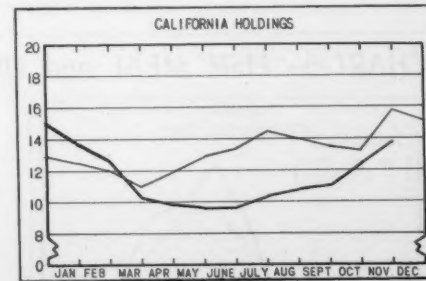
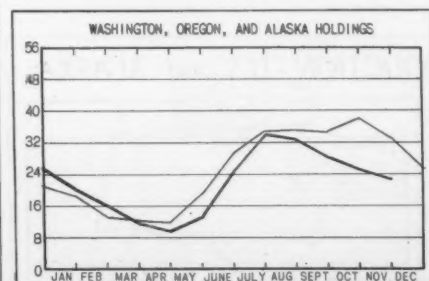
<sup>2/</sup>ALL EAST COAST STATES FROM N. Y. SOUTH.



<sup>3/</sup>OHIO, IND., ILL., MICH., WIS., MINN., IOWA, MO., N. DAK., NEBR., & KANS.



<sup>4/</sup>ALA., MISS., LA., TEX., ARK., KY., & TENN.

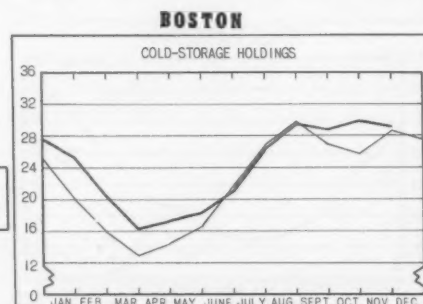
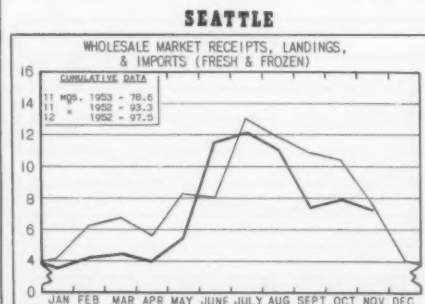
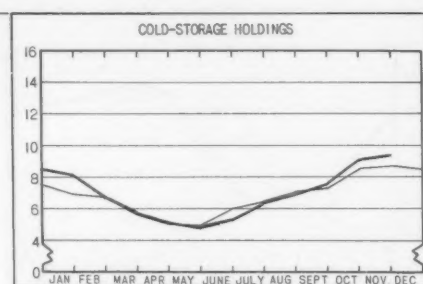
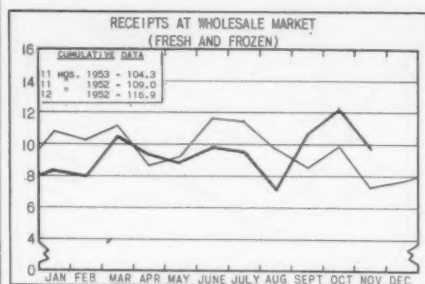
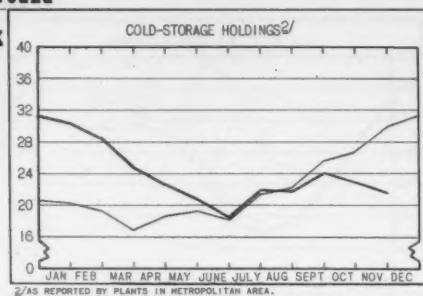
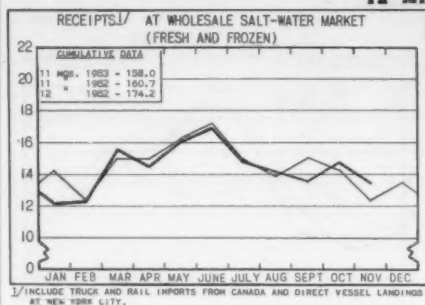


\*Excludes salted, cured, and smoked products.

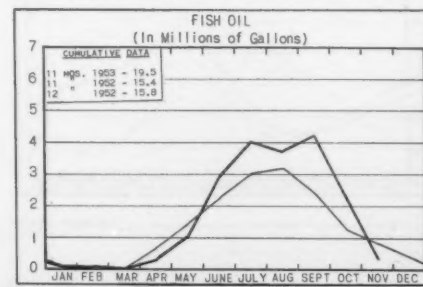
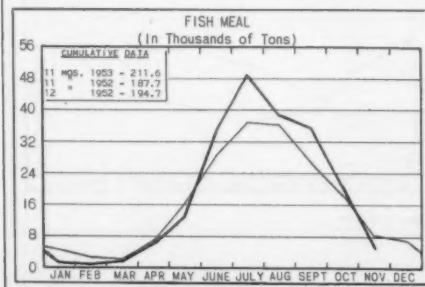


# **CHART 4 - RECEIPTS and COLD-STORAGE HOLDINGS of FISHERY PRODUCTS at PRINCIPAL DISTRIBUTION CENTERS**

In Millions of Pound

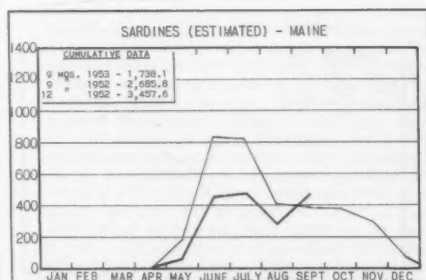
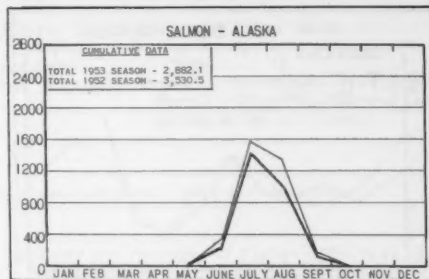
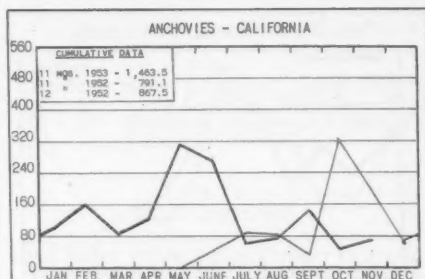
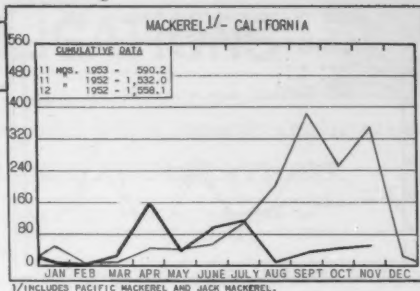
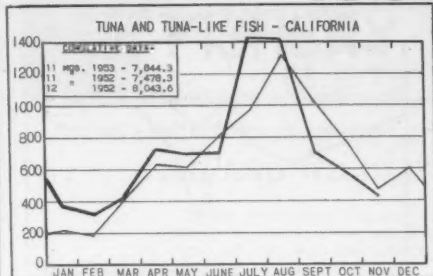


## **CHART 5 - FISH MEAL and OIL PRODUCTION - U.S. and ALASKA**



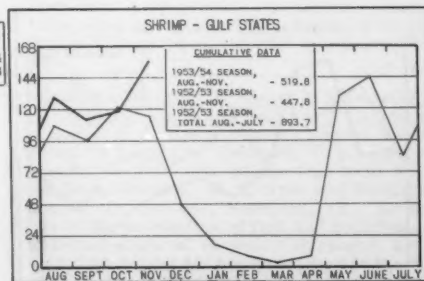
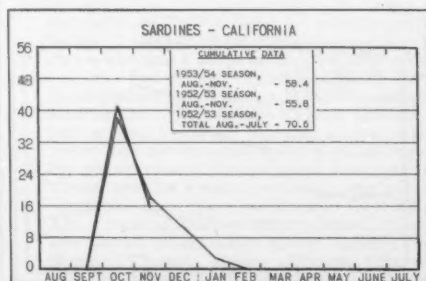
# CHART 6 - CANNED PACKS of SELECTED FISHERY PRODUCTS

In Thousands of Standard Cases



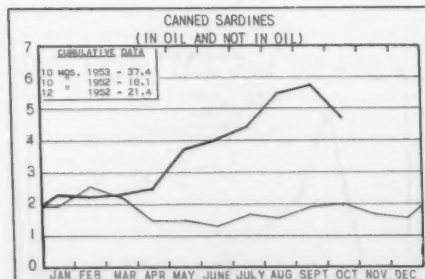
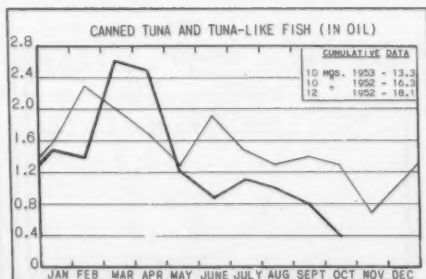
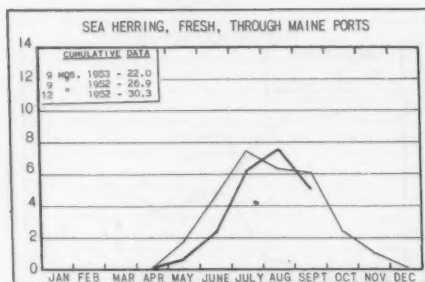
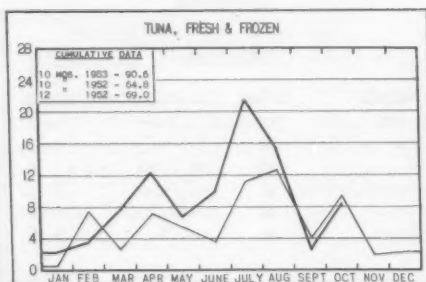
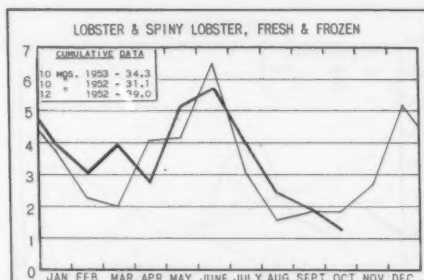
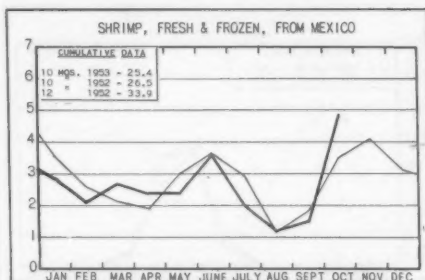
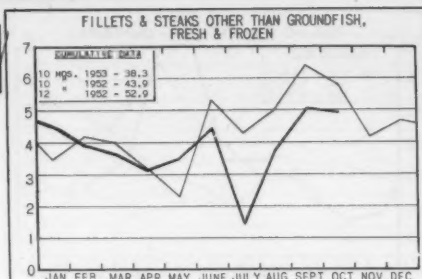
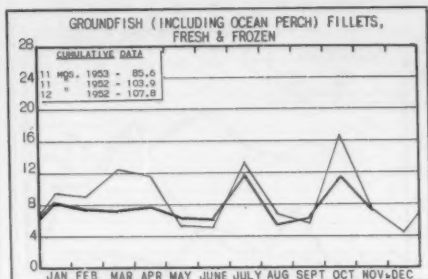
**STANDARD CASES**


Variety	No. Cans	Can Designation	Net Wgt.
SARDINES	100	½ drawn	3½ oz.
SHRIMP	48	—	5 oz.
TUNA	48	No. ½ tuna	6 & 7 oz.
PILCHARDS	48	No. 1 oval	15 oz.
SALMON	48	1-pound tall	16 oz.
ANCHOVIES	48	½ lb.	8 oz.



# CHART 7 - U.S. FISHERY PRODUCTS IMPORTS

In Millions of Pounds





# RECENT FISHERY PUBLICATIONS

Recent publications of interest to the commercial fishing industry are listed below.

## FISH AND WILDLIFE SERVICE PUBLICATIONS

THESE PROCESSED PUBLICATIONS ARE AVAILABLE FREE FROM THE DIVISION OF INFORMATION, U. S. FISH AND WILDLIFE SERVICE, WASHINGTON 25, D. C. TYPES OF PUBLICATIONS ARE DESIGNATED AS FOLLOWS:

- CFS - CURRENT FISHERY STATISTICS OF THE UNITED STATES AND ALASKA.  
SL - STATISTICAL SECTION LISTS OF DEALERS IN AND PRODUCERS OF FISHERY PRODUCTS AND BYPRODUCTS.  
SEP.- SEPARATES (REPRINTS) FROM COMMERCIAL FISHERIES REVIEW.

Number	Title
CFS-931	- Mass. Landings, August 1953, 8 p.
CFS-935	- Maine Landings, September 1953, 5 p.
SL - 17	- Wholesale Dealers in Fishery Products, Alabama (Revised), 4 p.

Number	Title
Sep. No. 362	- Freezing Fish at Sea--New England; Part 7 - Pictorial Story of Operations at Sea and Ashore.

THE FOLLOWING SERVICE PUBLICATIONS ARE AVAILABLE ONLY FROM THE SPECIFIC OFFICE MENTIONED:

Gulf States Production of Fishery Products for Selected Areas, 1952, by S. C. Denham, 40 p., processed, June 1953. (Available free from the Market News Service, U. S. Fish and Wildlife Service, 314 Custom House, 423 Canal St., New Orleans 16, La.) Part I of this report discusses the trends and conditions in the Gulf Coast fisheries for 1952 and Part II consists of statistical tables showing the landings of fish and shellfish by areas. In Part I the author discusses the shrimp fishery (landings, composition of catch, factors affecting production, ex-vessel prices, utilization, cold-storage holdings, and canned pack); oyster production and canned pack; blue crab landings; fish landings; imports; and rail shipments. Part II contains statistical tables on total landings by areas and species by months; by individual area and species by months; crab meat production by areas and months; fishery imports at New Orleans and Morgan City, La., and at Port Isabel and Brownsville, Tex.; monthly LCL express shipments from New Orleans by months and by destination; weekly canned oyster and shrimp packs; and a summary table of Gulf shrimp landings for selected areas. Tables showing the monthly wholesale price range of fishery products sold on the New Orleans French Market, fishery products market classifications in the Gulf area, and the monthly fishery production index for selected Gulf States areas are also included. These are the areas covered by the report: Apalachicola, Fla.; Mobile and Bayou LaBatre, Ala.; Pascagoula and Biloxi, Miss.; New Orleans and Lower Mississippi River, Golden Meadow, Houma, Chauvin, Dulac, Morgan City, Berwick, and Patterson, La.; Galveston, Freeport, Port Lavaca, Palacios, Aransas Pass, Rockport, Port Isabel, and Brownsville, Tex.

Landings and Receipts of Fishery Products at Seattle--1952, by Charles M. Reardon, 30 p., processed, May 1953. (Available free from Market News Service, U. S. Fish and Wildlife Service, 421 Bell St. Terminal, Seattle 1, Wash.) The Pacific Northwest fisheries trends and their effect upon Seattle fishery products receipts for 1952 are discussed in the first part of this report. Discussed by the author are the factors affecting the fisheries; the sources of supply for the fresh and frozen fishery products receipts at Seattle; the halibut, tuna, long-line, and other-trawl fisheries; shellfish receipts; and receipts of fish livers, liver oils, and other miscellaneous fishery products and byproducts. The tables present fishery landings and wholesale receipts (including approximate values) at Seattle for 1952 by species, by months, and by points of origin; monthly index of receipts of certain fishery products at Seattle; carload shipments of fishery products from Seattle by months; and names, classifications, and approximate standards for fresh and frozen fishery products sold on the Seattle market.

Production of Fishery Products in Selected Areas of Virginia, Maryland, and North Carolina (as reported to Hampton Fishery Market News Office), by Lester A. Keilman, 30 p., processed, November 1953. (Available free from the Market News Service, U. S. Fish and Wildlife Service, P. O. Box 447, Hampton, Va.) An analysis of the production of fish and shellfish in selected areas of Virginia, Maryland, and North Carolina during 1952 is presented in the first part of this report. The author discusses landings in the areas covered, production of principal species, the croaker fishery, the shad

THE FOLLOWING SERVICE PUBLICATIONS ARE AVAILABLE ONLY FROM THE SPECIFIC OFFICE MENTIONED.

fishery, and shellfish production. Information on the menhaden fishery is also presented--includes receipts reported by Virginia and North Carolina fish meal and oil plants by months for 1952 and 1951. Statistical tables make up the second part of the report--show production of fish and shellfish species for each area by months, shrimp landings in selected North Carolina ports by months, and total production by species for all areas covered. The areas covered in this report include: Atlantic, Beaufort, and Morehead City, N. C.; Norfolk, Portsmouth, Messick, Poquoson, Seaford, Yorktown, Newport News, Hampton, Lancaster County, Cape Charles, Oyster, Willis Wharf, and Wachapreague, Va.; Ocean City, Cambridge, and Crisfield, Md. In addition, shrimp landings only are reported for Englehard, Pamlico County, Atlantic, and Southport, N. C.

Receipts of Fresh and Frozen Fishery Products at Chicago - 1952, by G. A. Albano, 76 p., processed, November 1953. (Available free from the Market News Service, U. S. Fish and Wildlife Service, 200 N. Jefferson St., Chicago 6, Ill.) This report presents (1) an analysis of the

marketing trends for fresh and frozen fishery products and statistical tables on the receipts of fresh and frozen fish and shellfish at Chicago during 1952. Statistics on arrivals of fishery products at Chicago are presented by species and by states and provinces of origin; states and provinces by species; species by months; states and provinces by months; totals by species; and totals by states and provinces. A table shows the monthly range of wholesale prices of some of the leading varieties of fresh and frozen fishery products handled on the Chicago market. All arrivals are tabulated by method of transportation (truck, express, and freight). In the analysis of the marketing trends for fresh and frozen fishery products at Chicago, the author discusses the sources of the receipts, methods of transportation, months of greatest receipts, lake trout and white fish receipts, U. S. imports of fresh and frozen fish from Canada, U. S. imports of frozen fillets from all countries, and cold storage inventories. Also included is a table giving the names, classifications, and approximate weights of certain fishery products sold in the Chicago wholesale market.

## MISCELLANEOUS PUBLICATIONS

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE AGENCIES ISSUING THEM. CORRESPONDENCE REGARDING PUBLICATIONS THAT FOLLOW SHOULD BE ADDRESSED TO THE RESPECTIVE AGENCIES OR PUBLISHERS MENTIONED. DATA ON PRICES, IF READILY AVAILABLE, ARE SHOWN.

Algal Culture from Laboratory to Pilot Plant, edited by John S. Burlew, Carnegie Institution of Washington, Publication 600, 366 p., illus., printed, \$1.25 paper bound. Carnegie Institution of Washington, 1530 P Street NW., Washington 5, D. C., 1953.

This recently released monograph is a progress report of the developments in this new field of algal culture, including the investigations sponsored by the Carnegie Institution and parallel studies in other countries. It has as its purpose the stimulation of continuing research leading ultimately to the application of large-scale algal culture for the supplementation of existing sources of food, thereby easing the threat of malnutrition and famine in densely populated regions having only limited fertile land resources.

Part I is a summary of the current status of information on algae with respect to their general characteristics, efficiency for utilization of light energy, potential yield and growing space requirements, optimum environmental conditions for growth, the engineering aspects of large-scale production, evaluation studies as a source of human and animal food or as an industrial raw material, and details essential for the next research stage--a demonstration plant for large-scale algae production.

Part II is a series of six chapters dealing with the general subject "Conditions for Growth of Algae." Among the phases reviewed are the biology of algae, the inorganic nutrition of algae, large- and small-scale culture experiments on the efficiency of light conversion, adaptation of

growth techniques to use of full sunlight, and effects of diurnally intermittent illumination.

Part III is made up of eight reports of research conducted both here and in foreign countries on the growth of algae in mass cultures. Among the experimental techniques and equipment described for mass culture are: the large bottles; rocking tray; plastic and glass tubing. Growth-conditioning factors reported on include: carbon dioxide concentration; cultural medium, night temperature and aeration; day and night temperatures with full sunlight and with partial shading; and turbulence. Based on these experiments recommendations are made for: the most suitable strain of algae to use; the type of culture container; optimum temperature; turbulence; and carbon dioxide, fixed nitrogen and iron content in the medium. Some of the problems encountered in non-sterile culture in the greenhouse and in open air are described for experiments conducted in the Ruhr. The contamination effects of foreign algae and protozoa were serious handicaps to this type of culture, but the thought is expressed that further investigations may remove some of the disadvantages of this cultural technique.

Fogg and Collyer report on studies that show a good correlation between the species of algae and the ability to accumulate lipide, but that environmental conditions of growth are also important factors.

The interesting experimental studies at the Maracaibo Lake project on both the cultivation of algae and the administration of the harvested product to leprosy patients are described briefly.



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Japanese and Israel research on the same general factors of algal culture is reported in two brief statements.

Two reports of pilot-plant scale studies of *Chlorella* culture are presented as Part IV. The study of Arthur D. Little, Inc., is described in considerable detail. Polyethylene tubes were used as the culture containers. Centrifugal pumps served to circulate the medium through the tubes, cooled by cheesecloth covers sprayed with water, and with the carbon dioxide fed into the system from a storage tank. Nutritive elements required in minute quantities were added directly to the culture. Yields of algae are given for various operating conditions. Several methods for the preparation of the harvested algae for further use were investigated including: freezing; drying by spray method, lyophilization and solvent extraction. Detailed conclusions and recommendations on the variables studied are given.

The report of the Japanese studies using a concrete trough, covered with a polyethylene sheet, is very brief and is a preliminary report only.

Possible uses for algae is the theme of Part V. The first chapter is a detailed report of the composition of the fresh-water algae, with principal emphasis on protein, carbohydrate, and lipid content and including as minor components the minerals, sterols, pigments, and vitamins.

Chapter 2 is a summarization of the present state of our knowledge on the nutritional value of these algae. Most of the data available is encouraging although based largely on rat and chick-feeding tests. Toxicity, non-acceptability, and other adverse reactions have been established as being nonexistent for *Chlorella*. Most of the evidence for use as human food is inconclusive because the products tasted are not necessarily representative of those that could be prepared and developed once the fundamentals of cultivation are established and products are sought suitable for direct human nutritive purposes.

A very brief evaluation of the suitability of algae for industrial raw materials is included as the next chapter in Part V. Each of the major and minor constituents is given a preliminary evaluation but further study is said to be necessary to establish the true value of this type of material as an industrial raw material.

The last chapter is a preliminary report of the sterol content of algae. Experimental lots of several algae, grown at the University of Maryland, were analyzed for principal constituents, such as cortisone precursors. The cultural techniques used and that for the isolation of the sterols are included.

Some two hundred and ninety-seven references are included in the selected bibliography of mass culture of *Chlorella* and related subjects.

A detailed index of all principal subject and author references is an essential part of the monograph.

The report is a very comprehensive and well-documented presentation of the present status of our knowledge on the pertinent phases of algal culture. Interested persons will find it very complete, authoritative, and helpful in connection with further study of this field of research.

--Charles Butler

(Canada--British Columbia) Prospects for the 1953-54 Herring Fishing Season, by J. C. Stevenson, Circular No. 29, October 3, 1953, 6 p. with map, processed. Pacific Biological Station, Fisheries Research Board of Canada, Nanaimo, B. C. This is the ninth in an annual series of circulars dealing with the prospects for the British Columbia herring fishery. Various studies of the adult herring populations form the basis of these annual predictions of the success of fishing. The studies provide information on (1) the relative abundance of the different age groups in the fishing and spawning runs, (2) the size of the catch and the fishing effort expended, and (3) the relative size of the part of the population which escaped the fishery and spawned. Predictions are given by area.

(Canada) Fisheries Statistics of Canada, 1951, (New Brunswick), 8 p., printed, French and English, 25 Canadian cents. Department of Trade and Commerce, Dominion Bureau of Statistics, Ottawa, Canada. Consists of tables giving the production and landed and marketed values of the principal species of fish and shellfish landed in New Brunswick in 1949-51; quantity and value of manufactured fishery products for 1950-51; vessels used in the sea fisheries; capital equipment in the primary fisheries operations; and the number of persons engaged in the fisheries.

Comments on the Nomenclature of Canned Fish (Clupeoids and Scombers), by Ed. le Danois, Scientific and Technical Surveys No. 17, 25 p., printed. The British Food Manufacturing Industries Research Association, Randalls Road, Leatherhead, Surrey, England, November 1951. Reviews the species of two groups of fish, the Clupeoids and Scombers. It gives the characteristics of each species and the common names by which it is known in various countries. A suggested international nomenclature for the Clupeoids and Scombers is included.

Directory of Refrigerated Storage Warehouses in the United States, 93 p., processed. Production and Marketing Administration, U. S. Department of Agriculture, Washington 25, D. C., June 1953. Gives the names, addresses, and type of operation (including storage of fish) of refrigerated storage warehouses in the United States. This directory provides a means of extending recognition to warehousemen who have year after year contributed their time and money toward making possible the monthly "Cold Storage Reports" and allied reports on the refrigerated warehousing industry, and makes readily available to processors and food handlers information as to what storage facilities are available in localities where space is needed for their products.

Effect of Trade Agreement Concessions on United States Tariff Levels Based on Imports in 1952,

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76 p., processed, free. U. S. Tariff Commission, Washington 25, D. C., September 1953. This report considers the extent of tariff-rate concessions made by trade agreements and their effects on the average ad-valorem equivalents of the duties based on import data for 1952. It compares the rates in effect before any trade agreement, and the concessions in effect on January 1, 1945, and on January 1, 1953 (January 1, 1945, is significant because present trade agreements legislation provides that rates of duty in effect on that date may be increased or reduced by not more than 50 percent). Like the corresponding analyses in earlier Tariff Commission reports (October 1951), an attempt is made to indicate the proportion of dutiable imports into the United States that has been covered by concessions involving duty reductions or bindings of pre-existing rates, and the extent to which average rates of duty have been reduced by trade agreements. The report shows in twelve tables the average ad-valorem equivalents and the value of trade on which based, broken down by tariff schedule groups.

Of the fishery product imports in 1952, the report shows 78.4 percent of the total dutiable imports were subject to reduced rates of duty; 14.6 percent were bound at preagreement rates; and 7 percent subject to no concession.

The average ad-valorem equivalent of rates of duty in effect on fishery products before any agreement was 13.3 percent; on January 1, 1945, it was 11 percent; and on January 1, 1953, only 8.4 percent. Fishery products were among the lowest in average ad-valorem equivalent prior to trade agreement concessions. Reductions from preagreement rates were equivalent to 37 percent, from rates in effect January 1, 1945, 24 percent. Fishery products on which duty has been reduced showed an ad-valorem equivalent of 6.1 percent subject to rates in effect on January 1, 1953, representing a decline of 51 percent from preagreement rates and 36 percent from January 1, 1945. Preagreement rates bound against increase showed an ad-valorem equivalent of 12.4 percent; and rates on which no concession had been granted in trade agreements, 25.8 percent.

Concessions made in all trade agreements apply to United States import articles which account for 93.4 percent of the total dutiable imports in 1952 (including the group representing 4 percent, on which preagreement rates of duty were bound against increase). The average ad-valorem equivalent of the duties on total dutiable imports (based on 1952 import data) before any trade agreements were in effect was 24.4 percent. The average at rates in effect January 1, 1945, was 17.9 percent. As of January 1, 1953, it was 12.2 percent.

The average ad-valorem equivalent declined 50 percent from the rates in effect before any trade agreements were made. On commodities whose rates of duty have actually been reduced, the reduction is equivalent to 54 percent. The corresponding reductions in average ad-valorem equivalent from January 1, 1945, to date were 32 and 36 percent.

--A. M. Sandberg

(Formosa) Review on the Trawling Ground of South China Sea (I. Region Between Penhu and Hainan Island), by F. H. Liu, Report No. 1, 49 p., illus., printed, in Chinese and summary in English. Research Laboratory, Taiwan Fishery Rehabilitation Administration, Taiwan, October 1952. A brief summary of the fishing conditions of the region between Penhu and the Hainan Islands. Also describes the kinds of fish, fishing grounds, distribution of important fishes, body weight of the fishes caught, and oceanographical and meteorological conditions.

Fourth Annual Report on Exchange Restrictions, 1953, 351 p., printed. International Monetary Fund, Washington, D. C. Describes the work of the Fund in the field of restrictions in 1952 and early 1953, which was substantially directed to annual consultations with members maintaining any exchange restrictions inconsistent with the Fund Agreement. Part I of the report gives results of the 1952 consultations and considers the program for 1953. Part II summarizes by countries the factual situation developed during the consultations.

Almost all countries consulting held that the restrictions which they maintained were necessary for balance-of-payments purposes. Most countries reported that there was need to restrain over-all import demand, and frequently to discriminate in the application of their restrictions. Some countries indicated that, while using restrictions to cope with balance-of-payments difficulties, they also tried to apply them in such a manner as to serve other subsidiary purposes. For example, a number of countries with economic development programs argued that since they could not finance imports of all types, they allocated available exchange in such a way as to make sure that the needs of the programs were met. Some consulting countries stated that their restrictions served other than balance-of-payments purposes. Thus, certain specific restrictions on imports were stated to be used to protect domestic agriculture and infant industries. For some countries with multiple-exchange rates, their representatives indicated that these practices were substitutes for taxes, subsidies, or tariffs.

Export drives were among the direct efforts reported as undertaken to improve the balance-of-payments positions. These were facilitated by efforts to improve marketing techniques in the dollar markets, and to lower domestic costs and reduce export prices. Many countries reported continuing efforts to expand production so they would be able to increase exports and to reduce their dependence on imports, thus expecting to make possible substantial relaxation of restrictions. A number of countries stressed that efforts to expand export markets were significantly affected by economic conditions and restrictions in other countries.

The individual country summaries give the position in each country as of the end of 1952 with a brief statement of the major changes initiated during that year, or early in 1953. These country reports describe the restrictive system developments in their use, and how they work.

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As of February 1953, of the 45 countries member to the Fund, consultations with 35 had been completed. Various stages in the procedure had been reached with the 10 others.

--A. M. Sandberg

"Growth and Mortality of Oysters in Louisiana," by H. Malcolm Owen, article (also Contribution No. 8 from the Louisiana Department of Wild Life and Fisheries, New Orleans, La.), Bulletin of Marine Science of the Gulf and Caribbean, vol. 3, no. 1, June 1953, pp. 44-54, illus., printed. Marine Laboratory, University of Miami, Coral Gables (University Branch) 46, Florida. Experimental plantings of seed oysters (*Crassostrea virginica*) were made at five locations in the oyster-producing area of southeastern Louisiana. The results which were obtained showed that the yield of planted oysters is determined by the interaction between the growth factors and the mortality factors of the environment. It was found that undue mortalities occurred in certain areas of normally rapid growth in 1947-48.

(India) Investment in India--Conditions and Outlook for United States Investors, 171 p., illus., printed, 70 cents. Office of International Trade, U. S. Department of Commerce, Washington, D. C. (For sale by Superintendent of Documents, Washington 25, D. C.) This is one in a series of handbooks on foreign countries designed to bring together in convenient form basic information useful to potential investors. Includes a chapter on tariffs, trade controls, and exchange controls. Discusses the climate for foreign investment, the people and government, the economy, industrial policy, taxation, finance, basic resources, transportation and communication, and labor. Presents data on foreign trade, legislation and rules relating to industry, companies located in India with U. S. business relationships, and other phases of India's economy.

(International Tin Study Group) Supplement 1953 to The Statistical Year Book, 1952 (Tin, Tinplate, Canning), 91 p., printed, 12s. 6d. (US\$1.75); free to purchasers of The Statistical Year Book, 1952. International Tin Study Group, 7 Carel van Bylandtlaan, The Hague, Holland, 1953. This supplement brings up to date for almost every country of importance the statistical position of the tin, tinplate, tin alloy, and canning industries. Fish and shellfish products are listed as a group in many of the tables giving canning statistics.

Into the Freezer--and Out, by Donald K. Tressler, C. F. Evers and Barbara H. Evers, 243 p., illus., printed, \$3.75. The Avi Publishing Co., Inc., New York, N. Y., 1953. This second edition of Into the Freezer--and Out is designed to furnish authoritative information on all aspects of freezing foods in the home. Included are pointers on the selection of the proper type of freezer; the supplementation of the home freezer with frozen locker-storage space; the types and amounts of food to freeze; the step-by-step instructions for selection, preparation, packaging and freezing of the food; and the recipes for converting the frozen foods into delightfully different dishes for the family.

Suggestions for the selection, preparation, freezing and serving of fish and shellfish are included as part of the appropriate sections in the book. In one chapter, the methods recommended for the preservation of the sportsman's haul of fish and game are given. Procedures for the filleting or steaking of fish are supplemented with photos.

Miscellaneous other subjects included are a discussion of the nutritional value of the principal types of food, a planting and harvesting schedule for fruits and vegetables, and hints on methods for the advance preparation of pre-cooked frozen meals to use on special occasions or for "quickie" entertainment of unexpected guests.

--Charles Butler

Man's Foods, (Nutrition and Environments in Food Gathering Times and Food Producing Times), by L. B. Jensen, 288 p., printed, \$4.50. Garrard Press, 119-123 West Park Ave., Champaign, Ill., 1953. This is the story of man's quest for food through the ages, of the development of food-gathering and producing techniques that set man apart from other animals, and how man himself evolved because of, and in spite of, the foods he ate. The author states that the book was written "with a view of indicating a vast and still relatively unexplored field for those interested in the prehistory and history of many foods that have affected man's organic and social evolution." Food technologists, nutritionists, home economists, dieticians, physicians, veterinarians, biochemists, microbiologists, and students of fisheries and agriculture will be interested in this book. The history of foods is developed by the author under three major headings: (1) Food Gathering Times, covering a period of some 400,000 years; (2) Food Producing Times, which began about 8,000 years ago; and (3) Nutrition and its role in biological and social evolution. The text is supported by more than 650 references to authoritative sources. However, even the layman with an interest in science and history will find this book fascinating reading. Some of the nutritional influences on man's development are traced by the author. Interesting quotes are to be found throughout the book. Data from the many fields that contribute to the very interesting subject of food and man's physical and social growth have been drawn upon by the author. The information comes from the anthropologist, the explorer, the chemist, the physiologist, and the nutritionist. Nutritionists may not agree with the author in some instances, but it is a thought-provoking book. There is a chapter on domesticated animals and protein foods, which includes fish and shellfish as food. Other chapters deal with the spread of food production to Europe, Social Aspects of Nutrition and Bodily Changes; Climatic Stress and Nutrition; and the final chapter deals with Nutrition and Man's Welfare. There are a number of references to the use of fish and shellfish as food throughout the book, although because of the importance of fish and shellfish in the diet of certain countries today and in the past these data should have been expanded somewhat.

--J. Pileggi

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE AGENCIES ISSUING THEM.

Newfoundland Fisheries Development Committee Report, 137 p. and maps, printed, C\$1.00.

Published by authority of Canadian Minister of Fisheries and Newfoundland Minister of Fisheries and Co-operatives, St. John's, Newfoundland, 1953. (For sale by Queen's Printer, Ottawa, Canada; or St. John's Newfoundland.) A complete report of the Newfoundland Fisheries Development Committee is contained in this publication. Part I (The Problem and Its Setting) presents the number and location of fishermen and alternative occupations; a description of the fishing enterprise--evolution, organization, equipment, production, costs, and returns; describes the Labrador fishery; analyzes family income, expenditure, and standards of living. Part II (The Fishery Resources of Newfoundland) describes the fisheries for cod, haddock, other groundfish, other species of fish and shellfish, whales, and seals. Part III (The Market for Fishery Products) discusses the market for salt cod, frozen filets, cured herring, marine oils, and other fishery products and byproducts. Part IV (Fish Production and Distribution) presents the fishermen's needs; the requirements of management, processing and marketing of salt cod, frozen groundfish filets, herring products, chilled salmon, and live lobsters; and meals and oils. Part V presents a development program for Newfoundland's fisheries and touches upon exploration, demonstration, and scientific research; catching of fish; curing and processing of fish (with particular reference to utilization of groundfish resources); production of heavy-salted cod; housing for fishing communities; transportation; markets and market research; division of responsibility; and financing the program. The report also has four appendixes, one of which lists the papers embodying the results of the various surveys and studies undertaken by the Committee's special staff and those submitted by others at the Committee's request.

"Norwegian Minke Whaling," by Gordon C. Pike, article, Trade News, June 1953, vol. 5, no. 12, pp. 5-6, illus., processed. Department of Fisheries, Ottawa, Canada. Describes the development of the fishery for the small minke whale (*Balaenoptera acutorostrata*) which has been hunted in Norwegian waters for several hundred years.

"Observations on the Daily Movements of Fishes," by Arthur D. Hasler and James R. Villemonte, article, Science, September 18, 1953, vol. 118, no. 3064, pp. 321-22, illus., printed. American Association for the Advancement of Science, 1515 Massachusetts Ave. NW., Washington 5, D. C. Describes a study of the movement of schools of perch (*Perca flavescens*) at sunrise from 18- to 30-ft. depths to 25- to 35-ft. depths (where they hover in the daylight hours) adjacent to Second Point in Lake Mendota, Wisconsin. These observations were made with an echosounding unit in a 40-ft. Navy launch that records sound pulses returning from the bottom of the lake and from intervening schools of fish. It was seen on the oscilloscope screen that the schools of perch moved onto the Second Point shelf high over the bottom during their pre-sundown, inshore movement and reached their greatest concentration during the hour before

sunset. They settled lower as twilight approached and their echo trace blended finally into the bottom echo. No further evidence of their presence was discernible on the instruments after darkness set in. At sunrise the movement is reversed.

Philippine Fisheries, 169 p., illus., printed. Bureau of Fisheries, Manila, Philippine Islands, 1952. This manual was prepared to record the holding in the Philippines of the fourth meeting of the Indo-Pacific Fisheries Council from October 23 to November 7, 1952. It contains the following papers: "Geographic Setting of Philippine Fisheries," by Alfonso R. Sebastian; "Oceanographic Background of Philippine Fisheries," by Teodoro G. Megia; "Administration and Training in Fisheries," by Audres M. Mane; "Commercial Aquatic Fauna of the Philippines--I. Invertebrates," by Artemio M. Sarenas; "Commercial Aquatic Fauna of the Philippines--II. Vertebrates," by Inocencio A. Ronquillo; "Production Organization in the Philippine Fishing Industry," by Bayani Ongchango; "Fishing Gear Commonly Used in Philippine Fishing," by Santos B. Rasalan; "The Principal Marine Fisheries," by Porfirio R. Manacop; "Inland Fisheries of the Philippines," by Pedro A. Acosta; "Cultivation of Fish in Brackish and Estuarine Waters in the Philippines," by Andres M. Mane, Domiciano K. Villaluz, and Herminio R. Rabanal; "Marine Products of Minor Commercial Importance," Jose R. Montilla and Guillermo J. Blanco; "Methods of Preservation and Processing of Fish," by Claro Martin and Augusto D. Manalo; "Marketing Practices in the Philippine Fishing Industry," by Bayani Ongchango; "Basic Features of the Philippine Fishery Laws," by Jose G. Sanchez; and "Some Important Problems of the Philippine Fisheries Industry," by D. V. Villadolid and Daniel M. Bunag.

"The Problem of Slime in the Sanitation of Fish Plants," by C. H. Castell, article (also Atlantic Fisheries Experimental Station Note No. 130), Progress Reports of the Atlantic Coast Stations, No. 58, July 1953, pp. 5-9, printed, in English and summary in French. Fisheries Research Board of Canada, Atlantic Fisheries Experimental Station, Halifax, N. S. This article gives some general ideas about the problems resulting from the presence of slime on fish in relation to the sanitation of fish plants.

"Quantitative Measurement of the Effect on Oysters of Disease Caused by *Dermocystidium marinum*," by Sammy Ray, J. G. Mackin, and James L. Boswell, article (also Contribution No. 23 from the Department of Oceanography of the Agricultural and Mechanical College of Texas), Bulletin of Marine Science of the Gulf and Caribbean, vol. 3, no. 1, June 1953, pp. 6-33, illus., printed. Marine Laboratory, University of Miami, Coral Gables (University Branch) 46, Florida. Measurement of effect of the *Dermocystidium mycosis* in terms of weight of oyster meats has been accomplished by analysis of measurements of meat weights and shell capacity of 508 oysters over a period extending from April 1952 to August 1952. The 508 oysters included 198 heavily infected with *D. marinum*, 83 moderately infected,



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and 227 either lightly infected or negative. Weights of meats of heavily infected oysters and moderately infected oysters are compared, per unit of shell capacity, with the negative and lightly infected group. The data show that the average mean of meat weights of heavily infected oysters was about 33 percent less than that of the controls and that the moderately infected oysters were intermediate in loss of weight. Mathematical analyses of the data support the conclusion that disease plays a major role in reduction of meat weights. Analysis of the data also shows that reduction of weights is not only a matter of disease but of season, summer losses accruing from disease being significantly greater than those of early spring months. Experimental studies which eliminate factors of nutrition point to lysis of tissues as one of the major processes resulting in loss of weight. In these studies reduction of bits of excised gill tissues which were heavily infected with the fungus is compared with that of normal excised tissues when bacterial and other contaminants are excluded. Statistical methods and procedures are fully described.

"Reduction of Bacterial Contamination on Fillets by Washing the Round Fish and by the Use of Mechanical Skinners," by C. H. Castell, article (also Atlantic Fisheries Experimental Station Note No. 131), Progress Reports of the Atlantic Coast Stations, No. 56, July 1953, pp. 10-14, printed, in English and summary in French. Fisheries Research Board of Canada, Atlantic Fisheries Experimental Station, Halifax, N. S. This report deals with a series of tests which were made to find out exactly what benefit would result if the slime was removed from the fish before filleting them. The results showed that washing fish before filleting reduces the bacterial count on the fillets from 80 to 99 percent or more and will add from one to six days to the keeping time of the fillets, stored at 32° F. to 33° F. Almost the same result can be obtained by using a machine skinner that cuts down the gross contamination that occurs when fish are skinned by hand.

"The Relationship of High Temperatures and Low Rainfall to Oyster Production in Louisiana," by H. Malcolm Owen, article (also Contribution No. 7 from the Louisiana Department of Wild Life and Fisheries, New Orleans, La.), Bulletin of Marine Science of the Gulf and Caribbean, vol. 3, no. 1, June 1953, pp. 34-43, illus., printed. Marine Laboratory, University of Miami, Coral Gables (University Branch) 46, Florida. The oyster (*Crassostrea virginica*) production (1932-1950) of five parishes of south-east Louisiana were compared with the climatological environmental factors of temperature and rainfall. It was found that when the air temperature was 27.8° C. (81.2° F.) or over and the rainfall was 7.0 cm. (2½ inches) or under for prolonged periods during the preceding summer, there was a significant decrease in the production of oysters the following season. Conversely, it was found that production increased if preceded by a relatively cool-wet summer. From other experimental data which positively correlate to the studies as reported in this paper, it was concluded that the mortalities of oysters

occurred during adverse environmental conditions and that it was the mortality rather than the failure to grow that resulted in the decrease of production.

The Sea-Hunters, by Edouard A. Stackpole, 510 pp., illustrated, printed, \$7.50. J. B. Lippincott Company, Philadelphia, 1953. For those who are interested in the story of American whaling, this volume contains a wealth of well-documented material on the historical, geographical, and economic phases. For those who like to read of exciting adventure it offers numerous chapters, especially in the latter half of the book, which are as exciting and interesting as fiction. The first parts of the volume describe the initiation of American whaling in colonial New England and its struggles to survive. Part Four deals with the seldom-discussed whaleman-sealer who sought whales on the high seas and seals and sea elephants ashore. Part Five, almost half the volume, is devoted to the whaleman as a pathfinder and explorer, describing in fascinating detail his voyages, largely in the uncharted Pacific.

--A. W. Anderson

Some Conservation Problems of the Great Lakes, by Harlow B. Mills, Biological Notes No. 31, 14 p., illus., processed. Natural History Survey Division, Urbana, Illinois, October 1953. Discusses the aquatic environment in the Great Lakes, the Great Lakes fishery resource, changes in the physical environment, changes in the fish population, and shore-line problems.

So Easy Recipes and So Good, Too, 50 p., illus., printed. Home Economics Division, National Canners Association, Washington 6, D. C. Contains 121 tested recipes for preparing canned foods--selected because they are good tasting, practical, and dependable for preparation in the home. Some seafood recipes are included.

The State of Food and Agriculture 1953 (Part I - Review and Outlook), 129 p., illus., printed, US\$1.00 or 5s. Food and Agriculture Organization of the United Nations, Rome, Italy, August 1953. (For sale in U. S.: Columbia University Press, International Documents Service, New York 27, N. Y.) The annual review of the world food and agricultural situation (including fisheries) for 1952/53 has been divided into two parts. The first part, presented in this report, deals with the progress and problems of agriculture, fisheries, and forestry for 1952/53 and the immediate outlook for the following year. The second part--which is a review of governments' longer-term plans and progress of agricultural production, and an attempt to evaluate their probable effect on world agricultural production and trade and on levels of food consumption during the next four or five years--will be published later. These two reports form the basis of a principal part of the discussions during the biennial meeting of FAO's Conference at Rome which began November 23, 1953.

Besides a foreword by the Director-General of FAO, Part I consists of four chapters. The first chapter is a summary by regions and by

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commodities of the balance of the report. A world review and outlook is included in chapter II--agricultural production, food consumption and nutrition, international trade in agricultural products, the changing pattern of world trade in foodstuffs, the world economic situation, prices of agricultural products, farm income and investment, and the economic outlook for 1953 and 1954 are covered. Chapter III consists of a regional review and outlook by continents. Small sections on fisheries are included in these first three chapters. A review and outlook by commodities makes up chapter IV, and there is a fairly comprehensive section on fisheries products which discusses catches and landings; fresh, frozen, cured, and canned fishery products; and fish meal and oils.

The Striped Bass, *ROCCUS SAXATILIS*, Bulletin of The Bingham Oceanographic Collection, vol. XIV, article 1, 177 p., illus., printed, \$3.00. The Bingham Oceanographic Laboratory, Yale University, New Haven, Conn., December 1952. Includes the following papers: "The Life History of the Striped Bass, *Roccus saxatilis* (Walbaum)," by E. C. Raney; "Spawning Grounds of the Striped Bass or Rock, *Roccus saxatilis* (Walbaum), in Virginia," by E. F. Tresselt; "Variations in the Feeding Habits of the Striped Bass, *Roccus saxatilis* (Walbaum), in Chesapeake Bay," by E. H. Hollis; and "Studies of the Striped Bass, *Roccus saxatilis* (Walbaum), with Special Reference to the Chesapeake Bay Region during 1936-38," by V. D. Vladkyov and D. H. Wallace.

(Sweden) Yrkesfiskarnas Inkomster Och Utgifter M. M. År 1951 (Income and Expenditures of Professional fishermen in 1951), by Otto Zetterberg and Tage Zander, 18 p., printed in Swedish. (Reprint from *Jordbruksekonomiska Meddelanden*, July 1953, pp. 320-37). Isaac Marcus Boktr.-Aktiebolag, Stockholm, Sweden. Describes an investigation based on the income tax returns of 1,860 professional fishermen, representing 13.6 percent of Sweden's professional fishermen in 1938. In 1949 there was a reduction in the income of the professional fishermen, and this reduction continued in certain areas in 1950. During 1951, on the other hand, the income again increased, chiefly because of the increased average prices for the principal species of fish.

"Transfer Rollers for Fillet Conveyor Belts," by H. E. Power, article (also Atlantic Fisheries Experimental Station Note No. 129), Progress Reports of the Atlantic Coast Stations, No. 56, July 1953, pp. 315, illus., printed, in English and summary in French. Fisheries Research Board of Canada, Atlantic Fisheries Experimental Station, Halifax, N. S. This report describes two slightly differing transfer rollers for fillet conveyor belts which have proved successful. These rollers serve to transfer fillets from one conveyor belt to another conveyor belt, or drum, running in the same direction at a slightly faster speed and at a slightly lower level.

"Tuna Marking, a Progress Report," by Rober C. Wilson, California Fish and Game, vol. 39, no. 4 (October 1953), pp. 429-42, printed. California Department of Fish and Game, Sacramen-

to, Calif. The Pacific tuna fishery is the largest in California and the most valuable fishery in the country. It is important that the populations of tuna be defined, and one method of accomplishing this is through tagging. Morphometric studies have been revealing, but they lack the positive conclusions that a successful tagging program would furnish. Past experience in tuna tagging has been mostly unsuccessful, especially with albacore. It was concluded that a suitable tuna tag had never been used. In developing tags for the present program, the criteria included (1) ability of the tag to be readily seen, (2) minimum damage and impairment of movement for the fish, (3) chemical inertness and nontoxicity of the tag material, (4) ease of application, and (5) ability of the tag to stay on the fish for a long time. Previous tests of tuna tags in a water tunnel by Alverson and Chenoweth were valuable in developing nine possible tags for the present program. Two field trials have been carried out, and all but three types of tags have been abandoned. The successful tags are constructed of colored Fibron plastic tubing, outside diameter 0.098 inch, inside diameter 0.066 inch, and from 22 to 30 cm. in length. The legend is printed either on paper or on a smaller white piece of plastic tubing. Stainless steel wire or nylon line is threaded through the tubing for attachment. The tuna are tagged in a cradle with sponge rubber sides and a built-in measuring device. The tag is inserted, with a needle, through the flesh just back of the second dorsal fin. The tuna is then returned to the water as quickly as possible. Holding a hand lightly over the eyes of the fish aids in keeping it quiet during tagging. In the first field trial, 4 yellowfin tuna were recovered out of a total of 350 which were tagged. In the second field trial, 1,600 yellowfin were tagged, 10 were recovered; 223 albacore were tagged, 2 were recovered; 589 skipjack were tagged, none recovered. Plans call for continuance of the second field trial until early 1954, when it is hoped that sufficient long-range returns will be received on which a full program of tagging may be based.

--D. E. Powell

(United Kingdom) White Fish Authority, Second Annual Report and Accounts for the Year Ended 31st March, 1953, 36 p., printed, 1s. 3d. (31 U. S. cents net). Her majesty's Stationery Office, London, England, 1953. Describes the composition and general functions of the White Fish Authority; and discusses the production of fish and shellfish, marketing and distribution, and research and training program. Appendices present data on distribution of trawlers by ports; age distribution of trawler fleet; numbers, facilities and activities of coastal and inland wholesalers.

"The Use of Monofilament Nylon for Attaching Petersen Disk Fish Tags," by Parke H. Young, Jack W. Schott, and Robert D. Collyer, California Fish and Game, vol. 39, no. 4 (October 1953), pp. 445-62, printed. California Department of Fish and Game, Sacramento, Calif. A program of tagging kelp bass, initiated in 1952, revealed that stainless steel and silver wire pins were inadequate for use in affixing Petersen disk

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tags. The wire caught on rocks, kelp, and other debris, causing loss of many of the tags. Consequently, experiments using monofilament nylon for attaching disk tags to yellowtail and surf fishes were begun in 1952. These tests indicate that monofilament nylon is superior to stainless steel or silver wire under certain conditions. Aquarium experiments at Scripps Institution of Oceanography showed that, after 10 months of aquarium life, yellowfin and spotfin croaker were in excellent condition after tagging with disk tags attached with monofilament nylon. Conventional strap tags attached to the opercle in the same tests were lost. Tagging of sea bass in the ocean during 1952 resulted in a recovery rate of 9.9 percent for nylon as compared to 6.9 percent for silver wire. Sea tagging of yellowtail has revealed that nylon did not irritate the fish, and in each recovery there has been no change in tag condition. One of the problems connected with the use of nylon for tag attachment was that of finding proper knots. The following knots were used successfully: blood knot, turban knot, double square knot, triple overhand w/square knot. A length of nylon 30 inches long (doubled to form a length of 15 inches) has been found adequate for tagging. Tags were placed on the posterior dorsal part of the head on croaker and surfperch, with the nylon passing through the supraoccipital bone. Corbina, yellowtail, and kelp bass were tagged below and slightly back of the first dorsal fin insertion. For the slower-swimming fishes, slightly concave tags were used to reduce the tendency of the tag edges to cut into the fish. A plastic spacing device was developed to provide space for growth between the tag and the flesh of the fish. A special tagging needle tool was also developed. Tagging with nylon is slower than when wire is used for attachment. In the tests to date, there has been no evidence of corrosion of the nylon or indication of toxicity to the fish tagged. The cost of a strand of nylon for attachment of one tag is about 1½ cents. Although the present experiments are encouraging, not enough time has elapsed to evaluate the desirability of using nylon for long-term exposure to sea water.

--D. E. Powell

(Washington) 1952 Washington Commercial Fishing Statistics, 47 p., printed. Washington State Department of Fisheries, 1308 Smith Tower, Seattle, Wash., 1953. Consists almost entirely of tables showing landings of fish, shellfish, and fish livers in the State of Washington by districts and by species and gear. Data are for 1952, with comparative data for 1951 in all cases. Comparative statistics in many of the tables are shown back to 1935. The number of each species of salmon caught in each district by various types of gear is shown for 1935 through 1952. One of the tables shows Washington's canned salmon pack from 1900 through 1952, with the pack for the more recent years given in greater detail. Data on the canned pack of other fish and shellfish are also shown. In addition, the report includes historical data on the Washington and British Columbia packs of sockeye salmon, and the monthly salmon escapement over Bonneville Dam. Data are likewise presented

on the number of commercial fishing licenses issued by the Department and the receipts from licenses, miscellaneous tax items, and fines. The value of the Washington fishing industry is presented for 1952; and the wholesale value of the landings of fish, shellfish, and liver products by major species and categories is given for 1951 and 1952.

Foreign Commerce Yearbook, 1951, 728 p., \$1.50. Office of International Trade, U. S. Department of Commerce, Washington, D. C. (For sale by the Superintendent of Documents, Washington 25, D. C.) Contains basic statistics on foreign trade and related information concerning 87 countries, including condensed fisheries production data for a few of the countries. The highly condensed data covering 1951 were compiled from official publications of the various countries, supplemented by information from international agencies, the U. S. Foreign Service, and other U. S. Government sources. Figures are also given for 1948, 1949, and 1950. No prewar statistics are shown. For each country, a brief description is given of its area and population, agriculture, fishing, forestry and mining, industrial production, transportation, and finance. Accompanying trade statistics show value and volume of trade with other nations and value and volume of imports and exports of the principal commodities traded with the United States and the rest of the world. The new yearbook continues a series which has been issued by the Department of Commerce annually since 1922, except for the period 1939-1947, when the disruption of trade by the war and the subsequent unavailability of information on many areas caused a suspension.

On the Metamorphosing Stages of the Talabon Eel, MURAENOSOX TALABON (Cantor), with Descriptions of Some Leptocephali from the Estuaries of Bengal and Orissa, by S. Jones and V. Rayappa Pantulu, 12 p., illus., printed. (Reprinted from *Journal of the Asiatic Society, Science*, vol. XVIII, no. 2, 1952, pp. 129-140). Central Inland Fisheries Research Station, Barrackpore, Via: Calcutta, India. Describes the metamorphosing stages of *Muraenosox talabon* (Cantor) and some Leptocephali collected from the Burhabalang and Hooghly estuaries in Orissa and Bengal.

"Pen Construction, for Refrigerated Fish Holds" article, *Trade News*, April 1953, vol. 5, no. 10, pp. 7 and 9, illus., processed. Department of Fisheries, Ottawa, Canada. Describes the development of refrigerated fish holds for Atlantic fishing vessels. The tests were made under the direction of the Atlantic Experimental Station of the Fisheries Research Board of Canada at Halifax, N. S. Also describes the development of pen shells of heavy metal sheet construction which could be utilized in fish holds. The method of construction of the pens is described and illustrated.

Report to Congress on the Mutual Security Program, 65 p., illus., printed, 35 cents. Mutual Security Agency, Washington, D. C., June 30, 1953. (For sale by Superintendent of Documents, Washington 25, D. C.) Covers the

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operations of the Mutual Security Program during the six months ended June 30, 1953.

Studies on Fish Preservation at the Contra Costa Steam Plant of the Pacific Gas and Electric Company, by James E. Kerr, Fish Bulletin No. 92, 70 p., illus., printed. California Department of Fish and Game, San Francisco, Calif., 1953. The construction of a large steam plant on the San Joaquin River near Antioch, California, presented a grave potential threat to the valuable salmon and striped bass resources of the area. The studies described in this report reflect the cooperative effort of industry and government agencies to solve this difficult problem in conserving natural resources.

Wisconsin Game Fish, 26 p., illus., printed. Wisconsin Conservation Commission, Madison, Wisconsin. Discusses fish management programs, fishery biology, fish propagation, and rough fish control in Wisconsin. Descriptions of some of the most common fish in Wisconsin (with illustrations in color), their general characteristics and habits, and spawning habits are included. Although intended primarily for the sports fisherman, the publication contains information of interest to the commercial fisherman.

#### TRADE LISTS

The Commercial Intelligence Branch, Office of International Trade, U. S. Department of Commerce, Washington 25, D. C., has published the following mimeographed trade list. Copies of these lists may be obtained by firms in the United States from that Office or from Department of Commerce field offices at \$1 per list:

Oils (Animal, Fish, and Vegetable) - Importers, Dealers, Producers, Refiners, and Exporters - New Zealand, 5 p. (October 1953). Lists the names, addresses, and size of the various firms handling fish oils and their U. S. representatives, if any. The report points out: "About 80 percent of the fish oils produced are exported, mainly to the United Kingdom and Australia, though at one time the United States was a customer." It also points out that there is an industry in New Zealand producing shark-liver, halibut, cod-liver oils, etc.

Oils (Animal, Fish, and Vegetable) - Importers, Dealers, Producers, Refiners, and Exporters - Western Germany and Berlin. Lists the names, addresses, and size of the various firms handling fish oils. Also contains a brief summary of the animal, fish, and vegetable oils industry.



#### EFFECT OF BRINING COD FILLETS BEFORE FREEZING

Experiments have shown that a 1 minute dipping of cod fillets in a salt solution (15 percent NaCl) before freezing has no effect on the amount of drip of the fillets after defrosting, if the fillets are cut from very fresh cod and frozen before onset of rigor mortis, as is often the practice in Denmark. Fillets from cod stored several days in ice and fillets from very fresh cod subsequently stored up to 5 days at below 0° C. (32° F.) when dipped in salt solution before freezing showed less drip after defrosting, but the quality of such fillets was in all cases definitely inferior to fillets cut from very fresh cod and frozen without delay.

Arseretning fra Fiskeriministeriets  
Forsogslaboratorium, Copenhagen, 1953.



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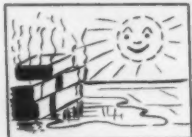
Pp. 7, 44--G. T. Sundstrom; p. 23--A. W. Anderson; p. 30--Daily News, St. John's, Newfoundland; pp. 36, 37--Food and Agriculture Organization, Rome, Italy.

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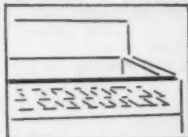
## GUIDES TO HANDLING FROZEN FOODS

Proper handling is the decisive factor in developing and retaining a volume-getting frozen food department, reports the November 25 Quick Frozen Foods (Retail Pocket Edition). Next to the consumer, the retailer is the most important factor in the expansion of frozen foods because he is next to the consumer. Consumers, in ever-increasing numbers, want and buy frozen foods--but only where they know that quality is assured. Packers lavish care on their frozen foods to assure quality. But results of this care are dissipated if the products are permitted to deteriorate in the store--sales and customers are lost.

Frozen foods are profit-making foods. They win customers and make sales. It pays to take care of them. Here are 10 guides to the proper store handling of frozen foods--10 direction signs to the successful winning of customers and making of sales.



1. Nothing invigorates you like sunshine and fresh outdoor air, but they're death to frozen foods. Get that delivery off the sidewalk fast!



6. Give customers maximum choice. Keep cabinets well-stocked at all times. Remember, the bigger the display, the bigger it sells.



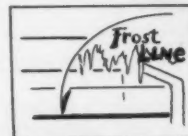
2. Rush the delivery to zero storage. Don't give it a chance to thaw. Frozen foods which defrost and are refrozen lose taste appeal and customers.



7. Be a good housekeeper. Keep cabinets tidy. Work over them often. Customers buy only what they can see--let them see what you have.



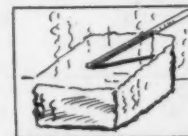
3. Frozen foods suffer damage when permitted to stand on the floor. Protect quality--get them off the floor and into the cabinet fast!



8. The plateline is the defrosting line; stock nothing above it. And keep packages back from the glass front to let the cold air circulate.



4. Don't leave anything in long enough to become frost-covered. Rotate stocks. Always take out old packages and place them on top of the new!



9. Frozen foods become incurably ill above zero temperature. Keep that destructive fever down. Check cabinet temperature every morning and every night.



5. Customers won't buy torn, crushed, or frost-covered packages. So take your choice--either you'll get rid of them or they'll get rid of your customers.



10. Stocks don't sell in the backroom. Order in just what you need between deliveries and a small reserve of fast-movers to avoid out-of-stocks.

